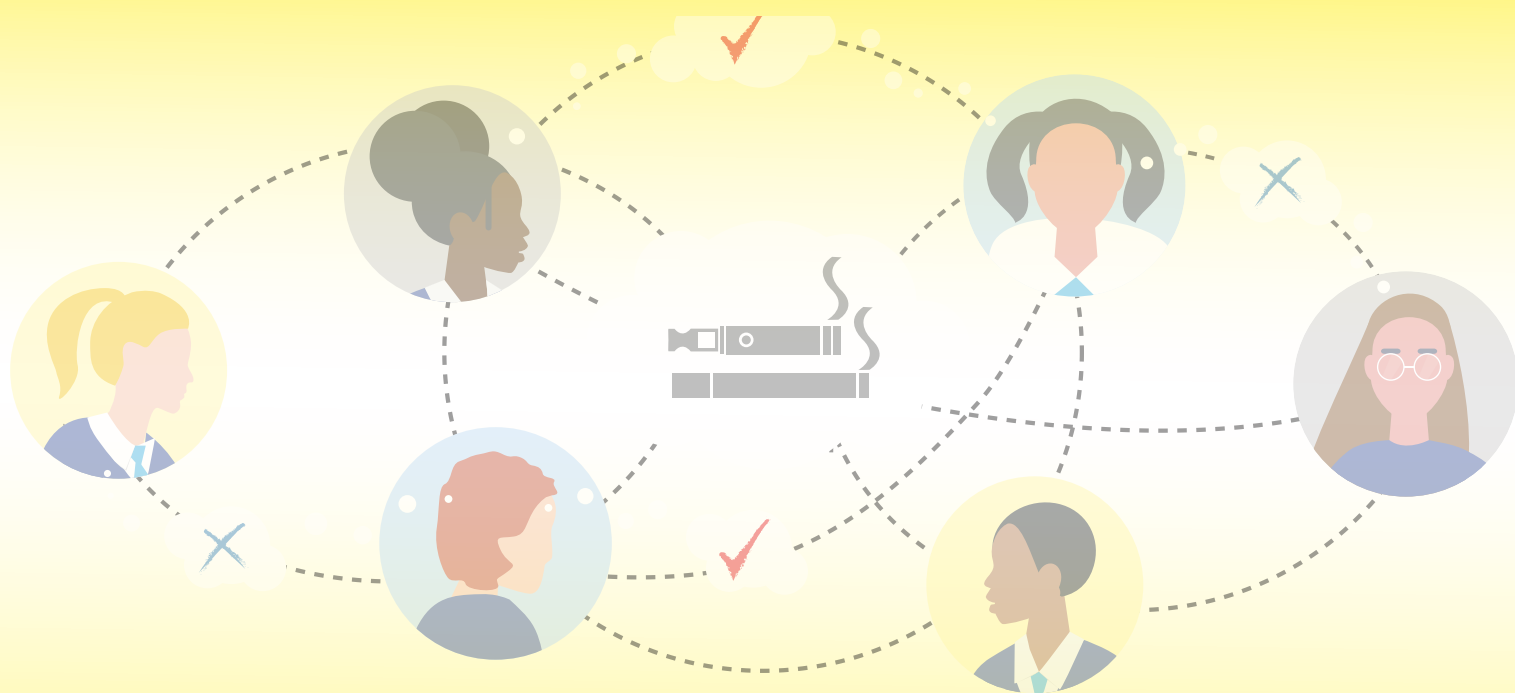




Wednesday 24 & Thursday 25 March 2021

Scientific Abstracts and Plain English Summaries



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Acknowledgements

This work was funded by the Medical Research Council (MR/R011176/1), with an additional Opportunity Led Award from the Public Health Agency (HSC R&D – COM/5410/17) and a Department for the Economy (NI) PhD Studentship. It represents a collaboration between Queens University Belfast, the Universidad de los Andes in Colombia, academic partners from the UK and the US, our Third Sector collaborators Cancer Focus NI and Evidence to Impact and the pupils and teachers at the participating schools in both cities, without whom the research would not have been possible.



MRC/CSO Social and Public Health Sciences Unit



ISBN 978-1-913643-11-9

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MECHANISMS Study: Using Game Theory to Assess the Effects of Social Norms and Social Networks on Adolescent Smoking in Schools

Ruth Hunter

Reference: Hunter RF, Montes F, Murray JM, Sanchez-Franco SC, Montgomery SC, Jaramillo J, Tate C, Kumar R, Dunne L, Ramalingam A, Kimbrough EO, Krupka E, Zhou H, Moore L, Bauld L, Llorente B, Sarmiento OL and Kee F (2020). MECHANISMS Study: Using Game Theory to Assess the Effects of Social Norms and Social Networks on Adolescent Smoking in Schools—Study Protocol. *Front. Public Health* 8:377. doi: 10.3389/fpubh.2020.00377

Scientific abstract

This proof of concept study harnesses novel transdisciplinary insights to contrast two school-based smoking prevention interventions among adolescents in the UK and Colombia. We compare schools in these locations because smoking rates and norms are different, in order to better understand social norms based mechanisms of action related to smoking. We aimed to: (1) improve the measurement of social norms for smoking behaviours in adolescents and reveal how they spread in schools; (2) to better characterize the mechanisms of action of smoking prevention interventions in schools, learning lessons for future intervention research. The A Stop Smoking in Schools Trial (ASSIST) intervention harnesses peer influence, while the Dead Cool intervention uses classroom pedagogy. Both interventions were originally developed in the UK but culturally adapted for a Colombian setting. In a before and after design, we obtained psychosocial, friendship, and behavioural data (e.g., attitudes and intentions toward smoking and vaping) from 300 students in three schools for each intervention in the UK and the same number in Colombia (i.e., ~1,200 participants in total). Pre-intervention, participants took part in a Rule Following task, and in Coordination Games that allowed us to assess their judgments about the social appropriateness of a range of smoking-related and unrelated behaviours, and elicit individual sensitivity to social norms. After the interventions, these behavioural economic experiments were repeated, so we could assess how social norms related to smoking changed, how sensitivity to classroom and school year group norms changed and how individual changes were related to changes among friends. This Game Theoretic approach allowed us to estimate proxies for norms and norm sensitivity parameters and to test for the influence of individual student attributes and their social networks within a Markov Chain Monte Carlo modelling framework. We identified hypothesized mechanisms by triangulating results with qualitative data from participants. The MECHANISMS study is innovative in the interplay of Game Theory and longitudinal social network analytical approaches, and in its transdisciplinary research approach. This study will help us to better understand the mechanisms of smoking prevention interventions in high and middle income settings.

Keywords: smoking prevention, adolescents, mechanisms, social networks, social norms, game theory.



The MECHANISMS study: building evidence for adolescents smoking prevention

Ruth Hunter

Plain English summary

What question are we trying to answer?

The MECHANISMS study explores how school based smoking prevention programs work for 12-13 year old pupils in Northern Ireland (United Kingdom; UK) and Bogotá (Colombia). This study aimed to help us better understand how two of these programs work, particularly exploring how the influence of our friends (i.e. social networks) and those around us (i.e. social norms) impact on smoking. We compare our results between the two settings, which have different norms, culture and smoking rates.

What did we do?

Pupils (aged 12-13 years old) from a whole school year group from 6 schools in Northern Ireland and 6 schools in Bogotá took part in one of two smoking prevention programs. The programs were the A Stop Smoking in Schools Trial (ASSIST) or Dead Cool. ASSIST makes use of peer influence effects by training the most influential pupils to spread anti-smoking messages through chatting with their friends. Dead Cool is delivered by school teachers in classrooms, and focuses on influences for smoking from friends, parents, other family members, and the media. Before and after the programs, pupils completed online experiments to assess their judgments about the social appropriateness of a range of smoking and vaping-related behaviours. Pupils also provided information on who their friends are, their smoking behaviour, intentions, knowledge, attitudes, and other information related to smoking. Using this information, we then undertook several analyses to help us understand how these two smoking prevention programmes work which are detailed in the presentations at this conference.

Why is this important?

Important questions we address include: 1) how were ASSIST and Dead Cool culturally adapted to be implemented in Bogotá; 2) exploring the stability of measures of norms and norm-following; 3) comparing different ways of measuring smoking and vaping social norms in teenagers; 4) why adolescents' intentions to smoke differ between the two countries, and what factors (both social and individual) have a bearing on those intentions; 5) how these complex interventions may change the reasoning of the participants to smoke or not smoke in different contexts; 6) exploring how friendship relations can influence social norms related to adolescent smoking in school-specific settings in Northern Ireland and Colombia; 7) to understand how social norms for adolescent smoking and vaping behaviours were transmitted through school social networks during two different types of smoking prevention programs; 8) exploring the peer influence effects by testing whether the outcomes reported by individuals were associated with the average outcomes reported by their friends, school class, or school year group.

So What?

This study will help us to better understand how smoking prevention programs work in high and middle income settings, which have different norms, culture and smoking rates.



Cultural adaptation of two school-based smoking prevention programs in Bogotá, Colombia

Sharon Sánchez

Authors: Sharon Sánchez, Luis Fernando Arias, Joaquin Jaramillo, Jennifer M. Murray, Ruth F. Hunter, Blanca Llorente, Linda Bauld, Sally Good, Judith West, Frank Kee, Olga L. Sarmiento

Scientific abstract

Smoking prevention among adolescents is a public health challenge. The local evidence in low and middle-income countries (LMICs) is limited and smoking rates remain high. Cultural adaptation is necessary to transfer evidence-based interventions to LMIC settings. This work describes the process of the cultural adaptation of two school-based smoking prevention interventions, ASSIST and Dead Cool, to be implemented in Bogotá. An heuristic framework guided the cultural adaptation. We recorded the modifications using the Framework to Report Adaptation and Modifications-Expanded (FRAME). 893 pupils from eight schools in Bogotá participated in a concurrent nested mixed-methods study to test the modifications. We conducted a qualitative descriptive case study and a quantitative pre and post quasi-experiment without a control. The qualitative analysis showed the pupils engaged well with both programs. The trial indicated that pupils in ASSIST schools (OR=2.00 [95% CI: 1.21 3.30]; p=0.007) and pupils in Dead Cool schools (OR=1.77 [95% CI: 1.13 2.77]; p=0.013) were more likely to increase their knowledge of smoking after the interventions compared to the baseline measurement. We reported contextual, content, training and implementation modifications to address cultural factors, to maintain the fidelity of implementation, and to increase the pupils’ engagement with the programs. Modifications incorporated the suggestions of stakeholders, the original developers, and local community members, whilst considering the feasibility of delivering the programs. Our findings highlight the importance of incorporating different roles in the cultural adaptation process and collaborative research.



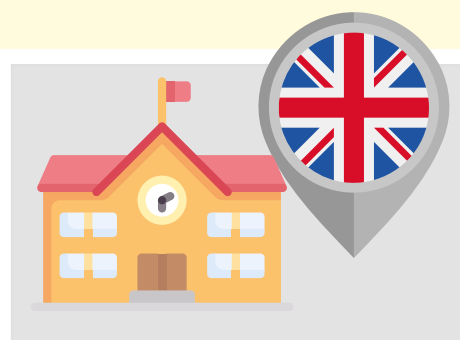
Fitting to the context: An experience of cultural adaptation of smoking prevention programs

Sharon Sánchez

Plain English summary

What question are we trying to answer?

Smoking prevention in schools is very important because most smokers start during adolescence when they are more susceptible to social influence. ASSIST and Dead Cool are two school-based interventions to prevent smoking, which have been developed and tested in the United Kingdom. Using the interventions in a new setting requires that they be culturally adapted aiming to involve the core elements, strategies, and activities in a different context. How can ASSIST and Dead Cool be culturally adapted to be implemented in Bogotá?



What did we do?

We followed a recognised guide to make and report the modifications. We involved stakeholders, the original developers, and local community members to make the modifications that allow us to maintain the fidelity of implementation, and to increase the pupils' engagement with the programs. ASSIST was changed to the culturally adapted name: *Entre Parceros* (Among Pals) and Dead Cool was adapted to *Bacanísimo* (Very Cool).



What did we find?

893 pupils from eight of Bogotá's schools participated in the interventions to test the modifications. Qualitative data showed that the pupils engaged well with both programs. Quantitative data indicated that after the intervention, knowledge about smoking increased among the pupils in both programs compared to their knowledge before the interventions.

Why is this important?

We conclude that broad stakeholder engagement and collaborative research are necessary for successful cultural adaptation of interventions.

So What?

Future research could focus on and assess the potential for long-term adoption of these interventions in different settings.



On the Stability of Measures of Norms and Norm-Following

Erik Kimbrough

Authors: Erik O. Kimbrough, Erin Krupka L, Rajnish Kumar, Jennifer M. Murray, Abhijit Ramalingam

Scientific abstract

Incentivized measures of norms and norm-following have become widely used tools across a variety of disciplines including economics, political science, psychology and public health. Theories of norm-following that motivate the use of these measures tend to assume a) that there exists a stable, commonly known injunctive social norm for a given choice setting and b) that each person has a stable propensity to follow social norms. In the absence of interventions that alter peoples' incentives or information about a given setting, then, measurements of social norms and the propensity to follow norms ought to show strong test-retest reliability. To our knowledge, no one has yet tested this assumption. Here we show in a sample of 1468 middle-schoolers that both measures are quite stable at the population level when resampled 10 weeks later. Individual-level responses are less stable, but they show evidence consistent with the hypothesis that changes in normative beliefs occur more frequently in contexts in which there exists substantial initial normative disagreement.



On the Stability of Measures of Norms and Norm-Following

Erik Kimbrough

Plain English summary

What question are we trying to answer?

Social scientists increasingly understand behavior as resulting from a combination of individuals’ personal motivations and social influences, such as the expectations of peers, friends, family, and authority figures (aka “injunctive norms” which tell someone what they ought to do). People differ in how much they allow social influences to shape their choices and, potentially, in their beliefs about what their peers, friends, etc expect them to do. Thus, to understand behavior, we need measurements of both an individual’s propensity to follow injunctive norms and their beliefs about the nature of those norms. Methods to make these measurements have been developed recently, and this paper assesses the extent to which these methods generate stable and reliable measurements that persist over time.



What did we do?

Both before and after the anti-smoking interventions, we asked participants about what constitutes appropriate behaviour in a widely studied choice problem known as the ‘dictator game’ – in which a person unexpectedly receives a sum of money and is asked whether they want to share any of it with a stranger, and we measured their willingness to give up their own money, just to follow an arbitrary rule. The first question measures an injunctive norm and the second measures an intrinsic willingness to follow rules and norms. Since the anti-smoking intervention is unrelated to these tasks, we take the opportunity to ask to what extent peoples’ responses change over time, in the absence of any intervention designed to change them.

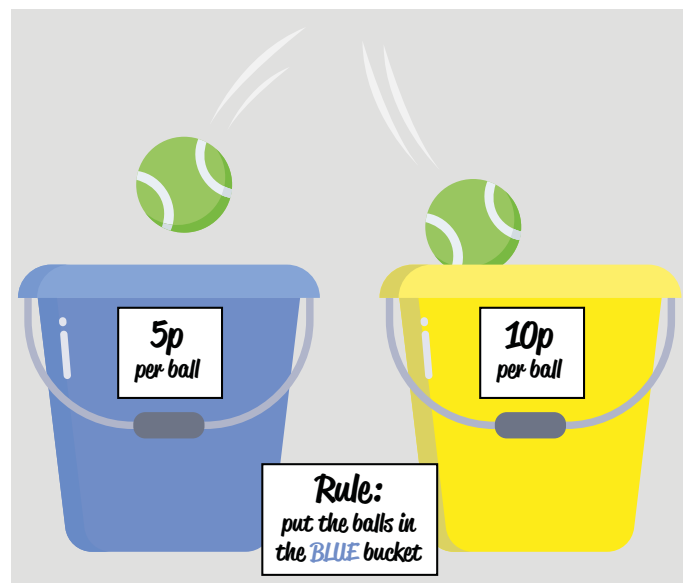
The dictator game



	Extremely Inappropriate	Very Inappropriate	Somewhat Inappropriate	Somewhat Appropriate	Very Appropriate	Extremely Appropriate
Keeping all the money for yourself...		X				
Giving some of the money to the other person...				X		



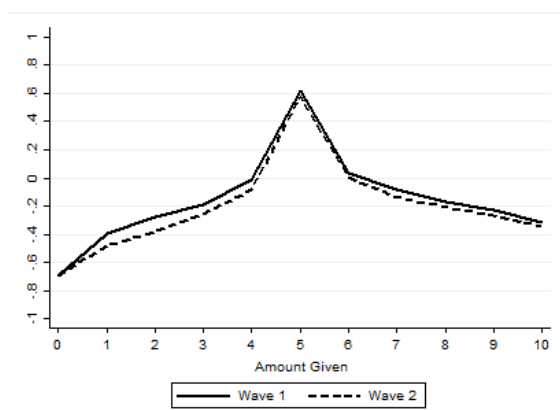
Arbitrary rule following task



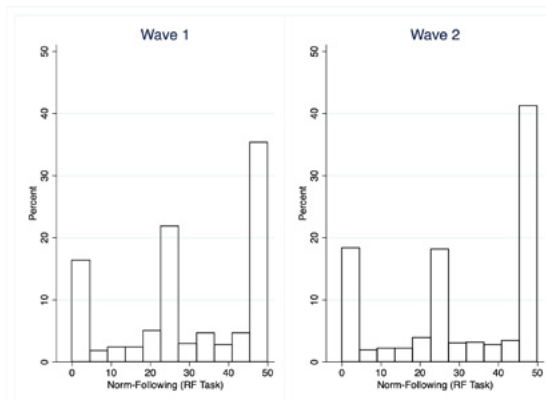
What did we find?

We find that both the propensity to follow norms and beliefs about norms are quite stable on average, though there is some variation at the individual level. Strikingly, those individuals most likely to change their beliefs are those whose beliefs initially differ from the beliefs of their peers. Perhaps more strikingly, we find some evidence that individuals view even a situation as simple as the dictator game from quite different perspectives. The average normative belief conceals a lot of differences across individual people, and so we should be careful not to simply assume that the average response captures a single norm in the population; instead, we should be conscious of variation in norms and try to better understand its origins.

The Dictator Game Results



Ball Game Results



Why is this important?

The theories that guide norm-based interventions rely on a number of assumptions about the stability of norms and of peoples' propensities to follow them. Surprisingly, neither of those assumptions has been rigorously tested. If we don't test those kinds of basic assumptions, we can end up interpreting our findings incorrectly (because conclusions depend, in part on our assumptions), or worse, we could end up designing interventions that fail because they depend on faulty assumptions being true.

So What?

It's reassuring to those of us working on norm-based interventions that norms and the propensity to follow them seem to be fairly stable, on average, in the absence of any intervention designed to change them. That said, going forward it will be important to try to better understand the sources of individual variation.



Confirmatory factor analysis comparing incentivized experiments with self-report methods to elicit adolescent smoking and vaping social norms

Jenny Murray

Reference: Murray JM, Kimbrough EO, Krupka EL, Ramalingam A, Kumar R, Power J McHugh, Sanchez-Franco S, Sarmiento OL, Kee F, Hunter RF. Confirmatory factor analysis comparing incentivized experiments with self-report methods to elicit adolescent smoking and vaping social norms. *Sci Rep.* 2020;10(1):15818. doi:10.1038/s41598-020-72784-z

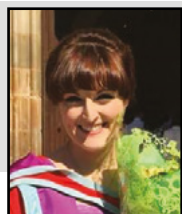
Scientific abstract

Background: Many adolescent smoking prevention programs target social norms, typically evaluated with self-report, susceptible to social desirability bias. An alternative approach with little application so far in public health is to use experimental norms elicitation methods.

Methods: Using the Mechanisms of Networks and Norms Influence on Smoking in Schools (MECHANISMS) study baseline data, from 12–13 year old school pupils ($n = 1656$) in Northern Ireland and Bogotá (Colombia), we compare two methods of measuring injunctive and descriptive smoking and vaping norms. These include: (1) incentivized experiments, using monetary payments to elicit norms; (2) self-report scales. Confirmatory factor analysis (CFA) examined whether the methods measured the same construct. Paths from exposures (country, sex, personality) to social norms, and associations of norms with (self-reported and objectively measured) smoking behaviour/intentions were inspected in a structural model.

Results: Second-order CFA showed that latent variables representing experimental and survey norms measurements were measuring the same underlying construct of anti-smoking/vaping norms (Comparative Fit Index = 0.958, Tucker Lewis Index = 0.951, Root Mean Square Error of Approximation = 0.030, Standardized Root Mean Square Residual = 0.034). Adding covariates into a structural model showed significant paths from country to norms (second-order anti-smoking/vaping norms latent variable: standardized factor loading $[\beta] = 0.30$, standard error $[SE] = 0.09$, $p < 0.001$), and associations of norms with self-reported anti-smoking behaviour ($\beta = 0.40$, $SE = 0.04$, $p < 0.001$), self-reported anti-smoking intentions ($\beta = 0.42$, $SE = 0.06$, $p < 0.001$), and objectively measured smoking behaviour ($\beta = -0.20$, $SE = 0.06$, $p = 0.001$).

Conclusions: This paper offers evidence for the construct validity of behavioural economic methods of eliciting adolescent smoking and vaping norms. These methods seem to index the same underlying phenomena as commonly-used self-report scales.



Comparing different ways of measuring smoking and vaping social norms in teenagers

Jenny Murray

Plain English summary

What question are we trying to answer?



The MECHANISMS study explores how school based smoking prevention programs work for 12-13 year old school pupils in Northern Ireland (United Kingdom; UK) and Bogotá (Colombia).

People who smoke usually start as teenagers, when the influence of social norms (i.e. what we think those around us believe, or do) on behaviour is strong. E-cigarettes are also becoming popular and although adults frequently use e-cigarettes to help stop smoking, teenagers are experimenting with them. Teenagers who vape are also more likely to start smoking. Therefore, we studied how social norms around smoking and vaping affect teenagers and their intentions, as this would help us better understand how some prevention programs work.

Public health researchers usually rely on self-report surveys to measure social norms for health behaviours, like smoking. Survey-based methods ask participants to report whether people who are important to them (e.g. parents, friends) think they should or should not smoke, or whether people who are important to them are smokers themselves. These methods are clear and simple for participants to understand, but researchers have concerns that participants may not respond truthfully if they think researchers do not approve of smoking. This is called “social desirability” bias.



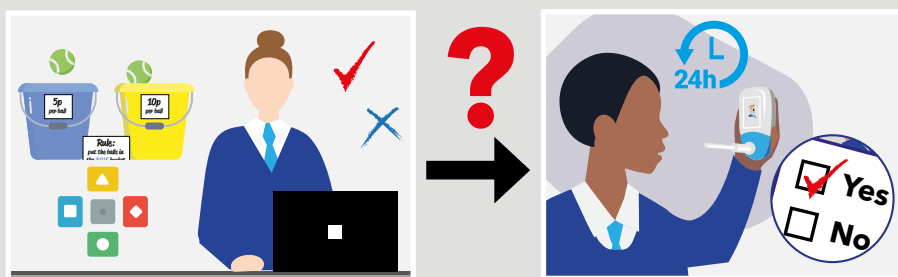
Experts in behavioural economics have developed experimental methods to measure social norms. These methods can help address our concerns about “social desirability” bias by providing pupils with small financial incentives to think about how most other pupils in their school year group would respond, instead of providing their personal opinions. For example, pupils are told that they will receive a payment if their answer to a random question matches the most common answer provided in their school year group. Using MECHANISMS study data, we aimed to compare both methods of assessing social norms to see if they were measuring the same “things” (e.g. underlying phenomena or processes like social norms).



What did we do?

At the start of the MECHANISMS study, pupils completed online experiments to assess their judgments about the social appropriateness of smoking and vaping-related behaviours. Pupils also completed surveys assessing self-reported smoking norms, smoking behaviour and intentions, and breathed into devices capturing their smoking behaviour in the past 24 hours. We compared the two methods to see whether they were measuring the same things as this assessment would help improve the future evaluation of such prevention programs.

We also explored whether the social norms measurements were performing as we would expect with pupils' smoking behaviour and intentions. Our research took place with whole school year groups of pupils in seven secondary schools in Northern Ireland (UK; Year 9) and eight secondary schools in Bogotá (Colombia; Year 7) between September 2018-November 2019.



What did we find?

1656/1824 pupils took part. Our results confirmed that our experiments were measuring the same things as commonly-used self-report surveys. Our social norms measures also showed expected relationships with pupils' smoking behaviour and intentions. Pupils who reported lower smoking norms had lower levels of smoking behaviour and intentions to smoke.

Why is this important?

This study uses novel experimental methods to measure social norms for adolescent smoking and vaping behaviours. Whilst experimental methods can help overcome “social desirability” bias, and provide richer information about how social norms impact smoking behaviours, self-report methods have the benefits of simplicity and low cost.

So what?

Our results show that experimental and self-report methods of measuring social norms can provide complementary insights to give a richer understanding of how social norms influence health-related attitudes and behaviour.



Socio-environmental and psychosocial predictors of smoking susceptibility among adolescents with contrasting socio-cultural characteristics: A comparative analysis

Chris Tate

Authors: Christopher Tate, Rajnish Kumar, Jennifer M. Murray, Sharon Sánchez, Shannon C. Montgomery, Felipe Montes, Laura Dunne, Olga L. Sarmiento, Frank Kee and Ruth F. Hunter

Scientific abstract

Introduction: Adolescent smoking is a prevalent risk factor for non-communicable disease in low-middle income countries (LMICs) as well as high-income countries. The cultural, normative, and social characteristics embedded in LMICs have led to an increase in cigarette use. The result is that LMICs account for a large proportion of global smoking rates. In contrast, high-income countries have successfully reduced the rate of smoking over time. This study explored the socio-environmental and psychosocial risk factors for smoking in a high-income versus upper-middle income setting.

Methods: Cross-sectional data were obtained from 1,573 male and female adolescents aged 11-15 years who completed self-administered questionnaires in schools in Northern Ireland and Bogotá, Colombia. Using logistic regression analysis, we examined how socio-environmental and psychosocial predictors of smoking susceptibility compared across the two countries.

Results: In Northern Ireland, family smoking, mother smoking, school smoking information, attitudes towards smoking, wellbeing and the personality factors of openness and extraversion significantly predicted smoking susceptibility. By comparison, friend smoking, self-efficacy, perceived behavioural control to quit smoking, and truancy were significantly associated with susceptibility in Bogotá.

Conclusions: The findings illustrate that there were differences in predictors of adolescent smoking susceptibility across the two settings. By using a comparative approach we demonstrate that smoking interventions and policies must be sensitive to the cultural and normative context within which they are implemented.

Keywords: Adolescent; smoking; social norms; risk factors; psychosocial; cognitions.



What factors contribute to smoking among adolescents in Northern Ireland and Bogota and how do they differ?

Chris Tate

Plain English summary

What question are we trying to answer?

This piece of research set out to address the question of why adolescents' intentions to smoke differ between two countries, and what factors (both social and individual) have a bearing on those intentions. This research is an important step in developing an understanding of why smoking among adolescents is more prevalent in some countries, and less common in others.



What did we do?

We collected data from students in Northern Ireland and Bogotá who completed questionnaires in 2019 to assess smoking intentions and the factors that might contribute to this behaviour. The data comprised of three parts: environmental smoking norms; individual attitudes towards smoking; and personality characteristics. We used this information to explore the differences in why adolescents smoke across the two settings.

What did we find?

The factors that influenced students' smoking intentions differed in Northern Ireland and Bogotá. For example, students in Northern Ireland who observed less smoking among family members were less likely to smoke. In Bogotá, students who saw fewer of their friends smoking were less likely to smoke in the future. Students who did not approve of smoking were less likely to smoke in Northern Ireland. In Bogotá students who believed they could resist the temptation to smoke in certain situation were also less likely to smoke in the future.





Smoking, friendship networks and norms:
a tale of two cities

Tabaquismo, redes de amigos y normas:
una historia de dos ciudades

Why is this important?

Our results confirm that the factors shaping adolescent smoking vary between the two locations of Northern Ireland and Bogotá. This is important as it illustrates that smoking prevention interventions must take account of how factors that influence adolescents to smoke are different across countries.

So What?

Future research will benefit from a comparative approach like the one adopted in this study to explore what makes some adolescents more susceptible to smoking. In addition to highlighting the importance of adapting smoking prevention interventions to the social and cultural context, our results support the need for comparative research that explores determinants of adolescent smoking.



What are the mechanisms by which adolescents chose to smoke or vape? A qualitative study in Bogotá and Northern Ireland

Sharon Sánchez and Shannon Montgomery

Authors: Sharon Sánchez, Shannon Montgomery, Erika Torres, Ana Ramirez, Angela López, Jennifer M. Murray, Ruth F. Hunter, Frank Kee, Olga L. Sarmiento

Scientific abstract

Globally, adolescent smoking is associated with health and social risks. Studies have assessed the effectiveness of multiple interventions based on behaviour change theories to prevent or reduce adolescent smoking. However, the evidence is limited for how complex smoking prevention interventions, like ASSIST and Dead Cool, may change participants' behavioural reasoning in different settings.

By engaging with pupils from schools in Northern Ireland and Bogotá, we used a realist approach and conducted a comparative qualitative analysis to explore the mechanisms by which ASSIST and Dead Cool change participants' reasoning to smoke or not-smoke in two different contexts. This approach assumes that the interventions are embedded in complex social systems, therefore, we anticipate that the same program might invoke varying resources, functions, and outcomes across multiple contexts.

We conducted 29 focus groups in 12 schools from Northern Ireland and Bogotá. In this qualitative study, 79 students participated in Dead Cool and 113 students and peer supporters participated in ASSIST. We used a Theoretical Domains Framework to conduct a thematic analysis with deductive two-cycle coding. Then, we compared both settings to uncover and align "realist" themes.

We found several differences in the contextual resources affecting behavioural reasoning. In Northern Ireland, participants identified previous information about tobacco, availability to purchase vapes through social media, and smokers within families. In Bogotá, participants identified availability to purchase cigarettes, smokers within families, and other substance misuse in the neighbourhood as affecting their behavioural intentions. The latter issue illustrates the risk of nicotine being a gateway to other substance misuse.

Changes in behaviour domains are embedded within a broad cascade of processes emanating from such contextual differences. After the interventions, students reported various changes regarding intention to smoke, social influences, perceptions and knowledge of consequences. A further "spill-over" outcome was that families and older peers were encouraged to not smoke by the participants.

Our findings highlight the importance of including context as a key element in the assessment of smoking prevention programs. Local contextual factors affecting students should be taken into account in the implementation of interventions to prevent smoking and the possible gateway effects of nicotine. Qualitative research allowed us to establish both individual and contextual characteristics that are related to smoking behaviour among adolescents.



A tale of two cities: the key of the context in the prevention mechanisms

Sharon Sánchez and Shannon Montgomery

Plain English summary

What question are we trying to answer?

ASSIST and Dead Cool are interventions to prevent onset smoking in schools. Although, their effectiveness has been tested, the mechanisms by which these interventions work are unclear. It is expected that the same programs may invoke varying resources, functions, and outcomes across multiple contexts. How do these complex interventions change the reasoning of the participants to smoke or not-smoke in different contexts?



What did we do?

We conducted a qualitative study to compare the mechanisms of change of both interventions between Northern Ireland and Bogotá. 192 students from Dead Cool and ASSIST gave us their opinions on 29 focus groups. We involved 12 schools from both settings.

What did we find?

We found that students have several different resources that affect their intentions in Northern Ireland and Bogotá. In Northern Ireland, adolescents emphasized that they have information from schools about tobacco, live within smoker families, and can purchase vapes by social media. In Bogotá, adolescents emphasized that they live within smoker families, live in neighbourhoods where other substance are misused, and can purchase cigarettes. The latter issue illustrates the risk of nicotine being a gateway to other substance misuse.

These contextual differences may produce different changes among the adolescents who participated in the interventions. Adolescents reported that after the interventions they have more beliefs about smoking consequences, knowledge about tobacco risk, and intentions to not smoke.

Why is this important?

Incorporating context characteristics as a key element is very important to assess smoking prevention programs and health promotion. Contextual demands of students in each setting should be taken into account when implementing interventions to prevent the possible gateway effect of nicotine.

So what?

Future qualitative research could include teachers and implementers to inquire about the mechanisms of interventions.



Influence of friendship networks in the social norms of smoking behaviours in adolescents in Colombia and Northern Ireland

Felipe Montes and Martha Blanco

Authors: Felipe Montes, Martha María Blanco, Andres Felipe Useche, Carlos Caro, Sharon Sánchez, Lei Tong, Jie Li, Huiyu Zhou, Shannon Montgomery, Olga L. Sarmiento, Frank Kee, Ruth F. Hunter

Scientific abstract

Introduction: We know little about how smoking prevention interventions can utilise inherent social network structures to influence protective social norms. This study aims to explore how social networks influence social norms related to adolescent smoking in school-specific settings in Northern Ireland and Colombia. Pupils (12-13 years old) participated in two smoking prevention interventions with different theoretical approaches in Northern Ireland and Bogotá (n=1344). Outcomes included experimentally derived smoking and vaping norms, self-reported and objectively measured smoking behavior, and self-reported smoking intentions, knowledge, attitudes, and psychosocial antecedents.

Methods: A Latent Transition Analysis (LTA) and a Component-based Feature Saliency for Clustering were implemented to identify latent classes associated with individual social descriptive and injunctive norms and to understand the transition of individuals to/from classes. Then we analysed if there were structural changes over time in the friendship networks using the Jaccard index, and finally, we assessed if social influence was observed among participants according to their friendship nominations and classes before and after the intervention.

Results: The LTA yielded three latent classes for each time (baseline and follow-up). The first class was characterized by students who believe that other people around them smoke, but they believe that people around them believe that smoking is not socially proper. The second latent class included the majority of students both in baseline and follow-up. This class was characterized by students who believe that other people around them do not smoke and believe that smoking is not socially proper. Finally, the third latent class was characterized by students who, regardless of whether fellow students believe others smoke, they believe that others believe that smoking is socially proper. We observed that only in Northern Ireland students did not change their social norms to class 3 after the intervention. This transition, that does occur in Colombia, represents greater social norms towards smoking. The ASSIST intervention in Northern Ireland offers the only scenario in which students change their social norms, leaving class 3. Also, the students who maintain their social norms against smoking after the intervention, nominate a greater proportion of friends who also remain in this class.

Conclusions: We observed that the ASSIST intervention, which is based on peer influence, shows a greater class transition to the social norms class against smoking than the Dead Cool intervention in Northern Ireland. Also, the students who before the intervention present social norms against smoking are influenced not to change by students with similar social norms, but in ways that seem dependent on the type of intervention and country. The methodology shown in this work can be replicated to assess the influence of social networks on social norms in different contexts.



Influence of friendship networks in the social norms of smoking behaviours in adolescents in Colombia and Northern Ireland

Felipe Montes and Martha Blanco

Plain English summary

What question are we trying to answer?



Pupils (12-13 years old) participated in two smoking prevention interventions in Northern Ireland (United Kingdom; UK) and Bogotá (Colombia). Outcomes from the intervention study included the student injunctive and descriptive social norms related to smoking. We know little about how smoking prevention interventions can utilise inherent social network structures to influence social norms. For this reason, in this study, we aimed to explore how friendship relations can influence social norms related to adolescent smoking in school-specific settings in Northern Ireland and Colombia.

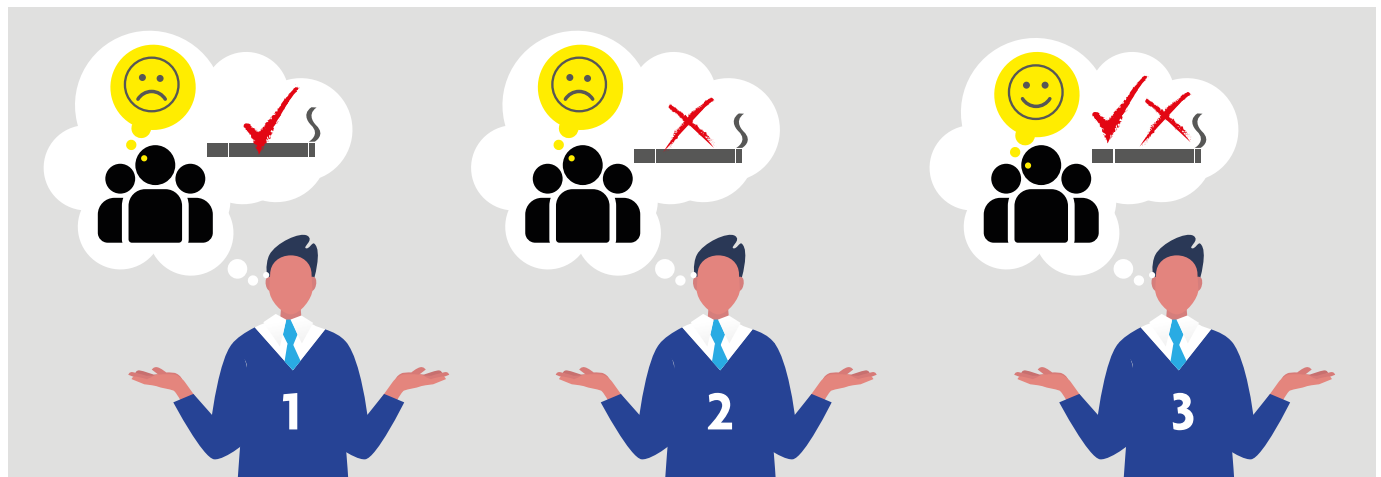
What did we do?

We explored the ways by which the social network structures, defined by friendship nominations, influence the social norms

related to smoking before and after the ASSIST and Dead Cool smoking prevention interventions in six schools in Bogotá (Colombia) and six schools in Belfast (Northern Ireland) as part of the MECHANISMS project. We identified classes associated with individual social descriptive and injunctive norms related to smoking. Also, we described the transition of individuals to/from these classes and analysed if social influence was observed among participants according to their friendship nominations and classes before and after the intervention.

What did we find?

We identified three classes in which students from schools in Northern Ireland and Colombia can be categorized, according to their smoking social norms, before and after the intervention. The first class was characterized by students who believe that other people around them smoke, but they believe that people around them believe that smoking is not socially proper. The second class included the majority of students both in baseline and follow-up. This class was characterized by students who believe that other people around them do not smoke and believe that smoking is not socially proper. The third class was characterized by students, who, regardless of whether students believe others smoke, they believe that others believe that smoking is socially proper. We observed that the ASSIST intervention, which is based on peer influence, shows a greater class transition to the social norms class against smoking than the Dead Cool intervention in Northern Ireland. Also, the students whose social norms maintain views against smoking after the intervention, nominate a greater proportion of friends who also remain in this class.

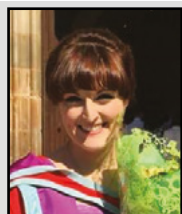


Why is this important?

Using a social network framework, we achieved an understanding of the change in social norms about smoking of school students in Northern Ireland and Colombia. The methodology shown in this work can be replicated to assess the influence of social networks on smoking social norms in different contexts.

So What?

Our results show that social network analysis can help to explain the change in social norms in school-specific settings.



Peer influence effects for spreading adolescent smoking and vaping norms in schools: The MECHANISMS study

Jenny Murray

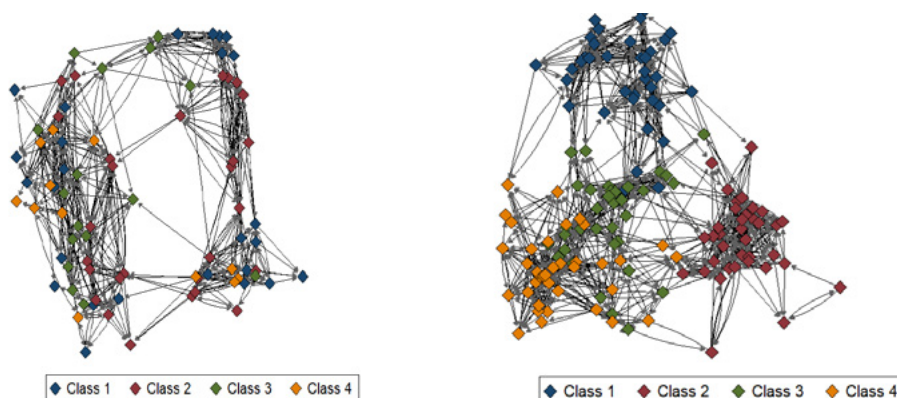
Reference: Murray JM, Sanchez-Franco SC, Sarmiento OL, Kimbrough EO, Tate C, Montgomery SC, Jaramillo J, Kumar R, Dunne L, Ramalingam A, Krupka E, Montes F, Zhou H, Moore L, Bauld L, Llorente B, Kee F*, Hunter RF* - Target journal: Nature Human Behavior

*Joint last author

Scientific abstract

Background: Smokers usually take up the habit during adolescence, when peer influences are strong and prevalent. Thus, smoking is often considered a “socially contagious” behaviour. Adolescence is also considered a key time for smoking prevention since the risk of developing smoking-related diseases increases as the number of years of smoking and the number of cigarettes smoked per day increases. Therefore, smoking prevention programs are typically targeted at early adolescents (12-13 years), and many use social norms-based approaches or attempt to leverage peer influences. The Mechanisms of Networks and Norms Influence on Smoking in Schools (MECHANISMS) study targeted whole school year groups of pupils aged 12-13 years in Northern Ireland (UK; Year 9) and Bogotá (Colombia; Year 7). We aimed to understand how social norms for adolescent smoking and vaping behaviours were transmitted through school social networks during two different types of smoking prevention programs: the A Stop Smoking in Schools Trial (ASSIST) and Dead Cool.

Social networks for two different schools from the study





Smoking, friendship networks and norms:

a tale of two cities

Tabaquismo, redes de amigos y normas:

una historia de dos ciudades

Methods: We examined *peer influence* effects using ordinary least squares regressions (OLS), and data from the average responses of friendship networks, school classes, and school year groups, for MECHANISMS study participants ($n=1344$) in schools in Northern Ireland ($N=6$) and Bogotá ($N=6$). Our outcomes included experimentally measured smoking and vaping norms, self-reported smoking norms, self-reported and objectively measured smoking *behaviour*, and self-reported smoking *intentions*, *knowledge*, *attitudes*, and other psychosocial antecedents. Before investigating peer influence effects, we examined pre- to post- intervention changes in all outcomes using Wilcoxon matched-pairs signed-ranks tests.

Results: Participants had higher smoking knowledge, and reported higher perceived physical and addiction risks for smoking at follow-up compared to baseline ($p<0.001$). Peer influence effects were observed for experimentally measured smoking and vaping norms (with focal participant outcomes at follow-up as the dependent variable) from the average responses of friendship networks (12/22 significant tests; standardized regression coefficients [β s]=0.08-0.19, $p\leq 0.01$), school classes (17/22 significant tests; β s=0.08-0.17, $p\leq 0.01$), and school year groups (10/22 significant tests; β s=0.08-0.15, $p\leq 0.01$). Peer influence effects were also observed for the self-reported outcomes, and objectively measured smoking behaviour.

Conclusions: Peer influence is an important determinant of adolescent smoking and vaping norms. The relative importance of norms suggests that policy should focus on norms change campaigns. Schools-based prevention research could benefit from investigating which peers are best placed within social hierarchies to transmit anti-smoking norms throughout school networks. Future research should investigate whether these results apply in different countries with varying cultural norms (e.g. comparing other collectivist and individualist societies).

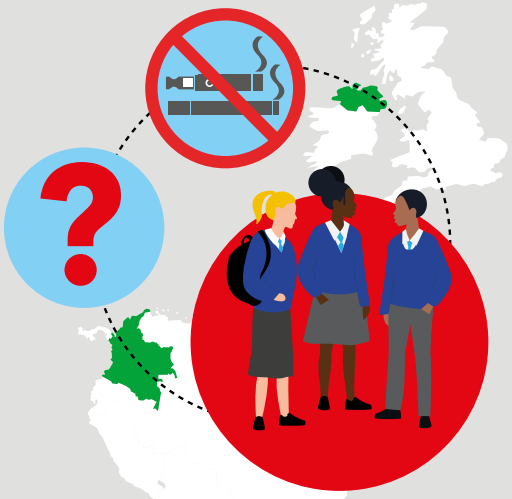


**Peer influence effects for spreading adolescent smoking and vaping norms in schools:
The MECHANISMS study**

Jenny Murray

Plain English summary

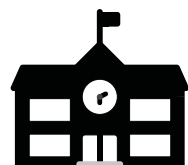
What question are we trying to answer?



The MECHANISMS study explores the way smoking prevention programs work for 12-13 year old school pupils in Northern Ireland (United Kingdom; UK) and Bogotá (Colombia).

People who smoke usually start when they are teenagers. This is because peer pressure from friends to smoke is strongest at this age. This is called “peer influence”. Social norms depend on connections and shared “understandings” between people about what behaviours are appropriate. Social norms for smoking can spread by peer influence. Therefore, it is important for smoking prevention programs to target early teenagers before they start smoking. Schools are ideal places for delivering smoking prevention programs because almost all children can be reached through schools, tobacco education fits naturally into their daily activities, and

where you go to school can be important in deciding who you choose as friends. In each school, all pupils in a school year group aged 12-13 years were invited to take part (Year 9 in Northern Ireland, Year 7 in Bogotá). We wanted to explore how social norms around smoking and vaping are established and spread in schools by peer influence effects.



12-13 years

... social norms around smoking and vaping are established and spread in schools by peer influence effects ...





What did we do?

Pupils took part in one of two smoking prevention programs: the A Stop Smoking in Schools Trial (ASSIST) or Dead Cool.



ASSIST makes use of peer influence effects by training the most influential pupils to spread anti-smoking messages through chatting with their friends.



Dead Cool is delivered by school teachers in classrooms, and focuses on influences for smoking from friends, parents, other family members, and the media.

Before and after the programs, pupils completed online experiments to assess their judgments about the social appropriateness of a range of smoking and vaping-related behaviours, and estimate their individual sensitivities to social norms. These experiments provided pupils with small financial incentives to match their appropriateness ratings to others' in their school year group, instead of providing personal opinions. Pupils also provided information on who their friends are, their smoking behaviour, intentions, knowledge, attitudes, and other information related to smoking. Using this information, we explore the peer influence effects by testing whether the outcomes reported by individuals were associated with the average outcomes reported by their friends, school class, or school year group. Our research took place in six secondary schools in Northern Ireland (UK) between January-June 2019, and six secondary schools in Bogotá (Colombia) between July-November 2019. We compare our results between the two settings, which have different norms, culture and smoking rates.

What did we find?



1344/1444 pupils participated. Pupils' smoking knowledge and perceived risks increased after the program. We had strong evidence of peer influence effects for our experiments norms measures from the average responses of friends, school classes, or school year groups.

Why is this important?

To improve public health interventions, it is important to understand how they work. Changing social norms is one way of affecting behaviour in groups of people. This study uses novel methods from behavioural economics to measure social norms, and help us to understand how ASSIST and Dead Cool work. We show that peer influence effects are important for spreading social norms for smoking and vaping through social networks in schools.

So What?

Future research should look at which children (e.g. those who are most «popular») are best placed to spread social norms. Future research should also examine whether these findings apply in different settings (e.g. other countries with different norms and culture).