2022

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774210

CO-CREATE

Article on the changes in attitudes/ readiness for action towards policy / D7.8

University of Oslo
31.12.2022

Deliverable administration and summary			
Due date	31.12.2022		
Submission date	29.12.2022		
Deliverable type	Report		
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Document change history				
Version	**Release date**	**Reason for Change**	**Status (Draft/In-review/Submitted)**	**Distribution**
V1	09.12.22		Draft	Internal reviewers
V2	20.12.22	Internal review and update of results	Internal review	Internal reviewer(s)
V3	29.12.22	Internal review	Submitted	

Dissemination level		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	

Executive Summary

Background

The overall aim of CO-CREATE is to reduce the prevalence of obesity among adolescents in Europe through policy actions to promote a healthier food and physical activity environment. Policy ideas co-created with adolescents in Youth Alliances and discussed with stakeholders in Dialogue Forums were the core activities of the policy actions to achieve such environmental changes. To support this, the Youth Alliances were developed based on the principles of youth-led participatory action research and the activities aimed to build the adolescents readiness for action, as well as shift their attitudes with regards to drivers of obesity and responsibility for obesity prevention from an individual to a systemic perspective.

The recruitment, execution and evaluation of the Youth Alliances and the Dialogue Forums are previously reported in D5.2, D5.3, D5.5, D5.6 & D5.7 and D6.4 & D6.5. This deliverable describes the quality of the CO-CREATE process evaluation questionnaire for youth, the changes in readiness for action and attitudes towards drivers of obesity and responsibility for obesity prevention among the adolescents in the Youth Alliances, as well as explores changes in the stakeholders participating in the Dialogue Forums with regards to capacity for youth involvement in addition to the other concepts.

Methods

The CO-CREATE process evaluation questionnaire (D7.7) for youth was used to collect data on readiness for action, drivers of obesity and responsibility for obesity prevention before the first Youth Alliance meetings and every month thereafter until the final meeting and then 3-6 months thereafter. The questionnaire was also used to collect data twice - at the beginning and end of the alliance period - from a comparison group of adolescents from areas with a similar socio-demographic profile. The baseline data from the alliance members and comparison group in Poland and Norway were used to explore the structural validity of the questionnaire, and a test-retest study was done in Norway to assess the reliability.

The stakeholder questionnaire was used to collect data on capacity for youth involvement, including some of the measures of readiness for action, and all the same measures of drivers of obesity and responsibility for obesity prevention as presented to the adolescents. The survey was undertaken the week before the dialogue forum, the week thereafter and again 3 months after the dialogue forum.

All data were gathered through an online survey tool with direct storage in the services for sensitive data (TSD) at University of Oslo, Norway. Each partner ensured the ethical approvals and consents as per the requirements of their countries. Data were analysed in TSD using SPSS.

Results

The exploratory factor analyzes on readiness for action identified the same four factors as hypothesized in the development of the CO-CREATE process evaluation questionnaire for youth. For

the attitudes toward obesity prevention, five factors on drivers of behavior and four factors on responsibility for obesity prevention were identified in the youth survey which is more than the four which were anticipated. In addition, there were 11 single questions which did not fit into the factors. Overall, six of the factors had a Cronbach's alpha value above 0.70, five factors had a value between 0.60–0.70, whereas the remaining two factors were below 0.60. The test–retest correlations ranged from 0.46 to 0.87.

In the youth sample there were significant differences between the intervention and comparison group in three of the drivers of obesity and three of the responsibility for obesity prevention factors, as well as in a single item on readiness for action either in the sub-sample 1 of intermediary effects or the sub-sample 2 of those who remained until completion. Alliance members scored higher on all significant factors. With the exception of «lack of knowledge/understading», all were in the expected direction. The majority (76 %) of adolescents participating in the alliances were female, but there were more of the adolescents who stayed in the alliances until the end who reported to have a medium (51 %) rather than a high (32%) family affluence although the proportions were equal at baseline.

There were no significant changes in the stakeholders (n=21 or 27) capacity for youth involvement, readiness for action or attitudes towards obesity prevention from before to just after the Dialogue Forums. At baseline, the stakeholders did, however, score higher compared with the youth baseline scores on both readiness for action scores, 7 out of 9 of the responsibility for obesity prevention and 4 out of 10 of the drivers of obesity questions.

Conclusion

The CO-CREATE process evaluation questionnaire for youth is considered reliable as a tool for measuring adolescents' readiness for action and attitudes toward obesity prevention. The changes in readiness for action or attitudes towards obesity prevention among youth were few and small, but mostly in the expected direction. The adolescents recruited to the youth alliances were mostly female, but the alliances managed to retain more of the medium compared with high family affluence youth, while the proportion of low family affluence remained the same. There were no significant changes in the responses from the stakeholders before and after the Dialogue Forums, but the difference in scores between youth and stakeholders at baseline were in the expected direction which supports the construct validity of the questionnaires.

Table of content

List of acronyms / abbreviations

WP – work package

Introduction

Work package 7 (WP7) has the overarching aim to evaluate the project using process, output and impact data. This aim is broken down into three objectives with corresponding tasks. This deliverable is part of Objective 7.3 *To evaluate the experiences/changes of the youth involved in the project (WP4 and 5) and to evaluate the experience of the participants in the forums (WP6)* with the corresponding Task 7.2 *To conduct a process evaluation of the changes of the youth and other stakeholders involved in the activities in WP4-6 within the five countries*. Task 7.2 has the following two deliverables, and involves six of the CO-CREATE-partners (UoO, UvA, LSHTM, CEIDSS, SWPS, EAT):

D7.7 A questionnaire for measuring attitudes/readiness for action towards policy measures to combat childhood obesity – (Delivered in M6)
D7.8 Article on the changes in attitudes/readiness for action towards policy measures to combat childhood obesity among youth and other stakeholders

Deliverable description

As per the grant agreement (page 123):

Task 7.2 An evaluation protocol will be written to assess impact of participation on changes in attitudes and readiness for action among the adolescents and stakeholders before, just after activities in WP4-6, as well as 4-6 months after the forum in WP6. The short questionnaires will be developed and pretested with the target groups in each case country. Matched controls will be recruited to serve as a control group.

Relationship to other project activities (WP5 and WP6)

The questionnaire was not used in WP4 as indicated in the grant agreement, because the WP4 activity was conducted through one or two meetings with youth to make the system maps and they were different from the youth in the youth alliances in WP5. The questionnaire was filled in by Youth Alliance members in WP5; before the first meeting, once every month during the time of the alliance and 3-6 months after the last alliance meeting. The control group was recruited from an area with a similar socio-demographic profile. Only the stakeholders in the Dialogue Forums in WP6 filled in their questionnaire before, just after and 3 months after the dialogue forum, as the youth were mainly from the alliances and were thus already filling in the youth questionnaire. The recruitment, execution and evaluation of the Youth Alliances and the dialogue forums are previously reported in D5.2, D5.3, D5.6 & D5.7 and D6.4 & D6.5.

Relationship to D7.7 (protocol and questionnaire)

The data used in this deliverable are collected according to the protocol in D7.7 and through the final Youth and Stakeholder questionnaires of which the baseline versions are included in appendices 3 and 4 of this deliverable.

Background

The overall aim of CO-CREATE is to reduce the prevalence of obesity among adolescents in Europe through policy actions to promote a healthier food and physical activity environment. This is to be achieved through working with adolescents as genuine project partners and taking a systems thinking approach. Adolescents were engaged in Youth Alliances to co-create policy ideas for obesity prevention and were also trained to advocate and discuss the policy ideas with relevant stakeholders. The stakeholders were invited to participate in Dialogue Forums developed to facilitate a safe space for youth to discuss their policy ideas with stakeholders.

The underlying hypotheses of the CO-CREATE intervention of Youth Alliances and Dialogue Forums were that involvement in youth-led participatory action research activities would increase the reported readiness for action among participating adolescents, in this case related to primary prevention of overweight and obesity. Furthermore, it was hypothesized that adolescents' participation in a project addressing obesity would lead to a shift in their conceptualization of obesity from a problem grounded at the individual level toward appreciating it as a population-level systems problem. The latter was also hypothesized for the changes in stakeholders before and after the Dialogue Forums, and in addition it was hypothesized that the organizations might become better at actively involving youth if they got engaged in collaborations after the Dialogue Forums.

Although increasing attention is paid to youth involvement and empowerment, there is a dearth of developed and validated measures that can be used to assess adolescents' readiness to engage in action to address obesity and in other intermediary outcomes or process measures within the field of obesity prevention. Some studies have, however, aimed to develop and test such measures, which can be used to evaluate youth advocacy programs (Millstein et al 2016), or general measures that can be used to assess youth-led participatory research approaches tackling a wide range of social and community problems (Ozer et al 2011). Similarly, there is a lack of tools to measure the readiness of an organization to practice real and active youth participation. However, a tool kit on “Evidence-based policy making for youth well-being” lists a series of questions to be answered in order to assess the authorities’ capacity to include young people in policy making process (OECD 2017, page 157).

The objective of this deliverable is to describe the quality of the CO-CREATE process evaluation questionnaire for youth, the changes in readiness for action and attitudes towards drivers of obesity and responsibility for obesity prevention among the adolescents in the youth alliances, as well as explore changes in the stakeholders participating in the Dialogue Forums with regards to capacity for youth involvement in addition to the other concepts.

Description of activities/Methods

Data from the Youth questionnaire

The collection and analysis of the data from the youth in the alliances, the comparison group as well as in a test-retest study in Norway is described in the article and manuscript attached in appendices 1 and 2. The final baseline youth questionnaire can be found in appendix 3. The questionnaire included

18 items measuring readiness for action and 34 items measured attitudes toward action to prevent obesity. The questions on attitudes toward action to prevent obesity were divided in two concepts: responsibility (17 items) and drivers of behavior (17 items).

Briefly, the questionnaire submitted in D7.7 in the fall of 2018, underwent pretesting in the five CO-CREATE countries as planned in the deliverable and was finalized in the spring/early summer of 2019. The youth and stakeholder surveys were undertaken as online questionnaires and set up with a direct storage in services for sensitive data (TSD) at University of Oslo, Norway. The relevant links were sent to the e-mail address or the cell phone number of the participants provided by the facilitators of the alliances. It took approximately 10–15 min to complete the questionnaire.

The aim was to recruit 15-20 youth in 3 alliances per country, and the youth should reflect a broad socio-demographic background. Given the challenge of catching and maintain the interest of youth in the topic of obesity prevention for up to a school year, attrition was foreseen and ongoing peer recruitment was seen as a possibility to ensure sufficient participation, but it was also recognized that this might change the socio-demographic profile of the participating youth. There were 159 youth answering the baseline questionnaire and 72 answering the questionnaire after the final meeting or 3-5 month after.

The comparison groups were to consist of 60 adolescents per country and recruited from an area with a similar socio-demographic profile as the alliances, and they should fill in the questionnaire once in the fall of 2019 and again in the late spring of 2020. There were 280 adolescents who responded to the baseline questionnaire whereas 123 adolescents answered the questionnaire twice.

The test-retest study (n= 39) was conducted in November 2021 in Norway. The youth filled in the baseline questionnaire twice with 9-14 days between in order to assess the reliability of the Youth questionnaire.

Exploratory factor analysis, Cronbach alpha and intra-class correlations were used to assess the validity and reliability of the youth questionnaire. A two-level linear mixed model with random effects for country as clusters at the upper-level was used to assess the changes in the readiness for action, drivers of obesity and responsibility for obesity prevention among the youth alliance participants. The analyses were conducted in two sub-samples; 1 (intermediary effects) and 2 (effects upon completion).

Data from the Stakeholder questionnaire

The Stakeholder questionnaire was distributed via e-mail as a link to the stakeholders together with the pre-dialogue forum information about a week before the Dialogue Forum, while the follow-up questionnaire was sent together with the follow-up e-mail in the week after the Dialogue Forum. About 3 months after the Dialogue Forum another e-mail was sent with the link to the final questionnaire. Non-responders were sent reminders. Distribution of the links was the responsibility of the partners organizing the dialogue forums. It took approximately 10–15 min to complete the questionnaire. The final baseline stakeholder questionnaire can be found in appendix 4.

There was not a set target of stakeholders, but the aim of 20 Dialogue Forums were reached and thus 60 stakeholders (3 per forum) could be expected. There were 52 stakeholders who filled in the baseline questionnaire and 27 who filled in the follow-up questionnaire either just after or 3 months after.

Descriptive statistics were run to describe the stakeholders by country, age, gender and type of stakeholder. Furthermore, the mean scores of the organizations' capacity for youth involvement and readiness for action on obesity as well as drivers of obesity and responsibility for obesity prevention before and after the dialogue forum were calculated. The latter scores used the same factor structure as for the youth since the stakeholder sample was too small to run a separate factor analysis.

Results

1. Quality of the CO-CREATE youth questionnaire

In this article only the baseline data from Norway and Poland was used as these were the two largest samples so together they reached the required number of participants to do factor analysis. In total, 328 Norwegian and Polish adolescents from the alliances and comparision groups filled in the baseline questionnaires which were used for the methodological article. The adolescents had a mean age of 16.7 (± 1.0), a higher proportion were females (73%), a bit more than half (56 %) had a high family affluence score whereas only 10 % had a low family affluence score and 92 % were born in Norway or Poland.

The exploratory factor analyses on readiness for action identified the same four factors as hypothesized in the development of the questionnaire: ways of expressing political voice (5 items), competence for civic action (5 items), advocacy outcome efficacy (3 items), and knowledge of resources (4 items). The item "using social networking platforms to discuss a social issue" did not fit with any of the factors and was thus kept as a separate item.

For attitudes toward obesity prevention, the exploratory factor analysis identified more factors than initially assumed, with four factors on levels of responsibility and five factors on drivers of behavior. In addition, there were five categories of potentially responsible actors which were not included in any factors: "each individual," "schools," "companies that help people diet," "transportation companies," and "town and city planners." For the drivers the following 5 items were not included in any of the five factors: "increased use of motorized transportation," "biological factors," "lack of time to lead a healthy lifestyle," "the lack of policies on preventing overweight and obesity," and "lack of focus on healthy lifestyle among friends and family".

Overall, six of the factors had a Cronbach's alpha value above 0.70, five factors had a value between 0.60–0.70, whereas the remaining two factors were below 0.60. The test–retest correlations ranged from 0.46 to 0.87.

2. Changes in Youth

In sub-sample 1 (intermediary effects, n=213), alliance members scored significantly higher than the comparison group on the responsibility of "government/public policy" (b = 0.56, 95% CI = 0.11, 1.01), and on "social media" (b = 0.50, 95% CI = 0.08, 0.91) as a driver of behaviour at follow-up.

In sub-sample 2(effects upon completion, n=195), Alliance members scored significantly higher than the comparison group upon completion on "using social networking platforms to discuss a social issue" (b = 0.62, 95% CI = 0.21, 1.03), responsibility of "private business" (b = 0.50, 95% CI = 0.15, 0.85) and "transportation companies" (b = 0.42, 95% CI=0.02, 0.82), and on "lack of knowledge/understanding" (b = 0.37, 95% CI = 0.06, 0.67) and "lack of focus on healthy lifestyle among friends and family" (b = 0.44, 95% CI = 0.00, 0.87) as drivers of behaviour.

Significant interactions between group and time between baseline and follow-up were found for "advocacy outcome efficiency" (b = -0.04, 95% CI= -0.07, -0.00) and "each individual" (b = -0.06, 95% CI = -0.12, -0.00) in sub-sample 1, and for "government / public policy" (b = -0.05, 95% CI = -0.09, -0.01) in sub-sample 2.

The majority of the youth recruited to the alliances and responding to the baseline questionnaires were female (76%) and there was an equal distribution of youth of medium (42%) and high (40%) family affluence. Among the youth remaining in the alliances until the end and responding to the questionnaires the proportion of female was unchanged, but there was a higher proportion of youth reporting medium (51 %) compared to high (32 %) family affluence.

3. Changes in Stakeholders

Table 1 shows that there were 52 stakeholders who responded to the baseline questionnaire. The majority of the stakeholders were from Norway (31 %) or Portugal (27 %), they were female (65 %) and the age range had a normal shaped curve with peak at the age group 35-44 years old. The stakeholders mainly represented experts (37 %) and civil society organizations (19 %), but also businesses (6 %) and politicians (5 %) were present.

Table 1. Background characteristics at baseline for stakeholders (n=52) participating in the CO-Create dialogue forums

	% (n)
Country	
the Netherlands	4 (2)
Norway	31 (16)
Poland	17 (9)
Portugal	27 (14)
the U. K	21 (11)
Sex	
Male	35 (18)
Female	65 (35)
Age	
34 and under	23 (12)
35 - 44	33 (17)
45 - 54	25 (13)
55 and over	19 (10)
Which stakeholder category do you represent?	
Policy maker	10 (5)
Experts	37 (19)
Representative from business	11 (6)
Civil society organization	19 (10)
Youth and other community member	8 (4)
Other	15 (8)

There were 27 stakeholders who responded both before and after the Dialogue Forum to the attitudes towards obesity prevention and readiness for action questions, whereas there were 21 who responded to the youth engagement questions. There were no changes in stakeholders attitudes towards obesity prevention (Table 2) or in the organizations youth engagement after the Dialogue Forums (Table 3).

Table 2 Comparison of mean values between baseline and follow-up in sample of stakeholders (n=27) participating in the CO-Create dialogue forums

Factors	Baseline, mean	SD	Follow-up, mean	SD	diff	SD	d	p
Advocacy outcome efficacy	4,40	0,52	4,28	0,90	0,11	0,91	0,12	0,53
Knowledge of resources	4,36	0,73	4,49	0,80	-0,13	0,84	-0,15	0,43
Local environment	4,31	0,50	4,31	0,65	0,00	0,39	0,00	1,00
Private business	3,91	0,89	3,83	0,88	0,07	0,55	0,13	0,49
Food and drink industry / business	3,94	1,18	3,95	1,10	-0,01	0,74	-0,02	0,93
Government / public policy	4,43	0,86	4,59	0,77	-0,16	0,45	-0,36	0,07
Each individual	4,37	0,56	4,56	0,58	-0,19	0,62	-0,30	0,13
Schools	4,37	0,69	4,44	0,58	-0,07	0,47	-0,16	0,42
Companies that help people diet	3,93	0,87	3,70	1,07	0,22	0,75	0,30	0,14
Transportation companies	3,52	1,01	3,37	1,08	0,15	0,72	0,21	0,29
Town and city planners	4,26	0,86	4,44	0,58	-0,19	0,62	-0,30	0,13
Access to unhealthy food	4,36	0,74	4,36	0,78	0,00	0,32	0,00	1,00
Barriers to healthy food and physical activity opportunities	4,02	0,86	4,04	0,75	-0,01	0,61	-0,02	0,92
Social media	3,67	0,76	3,80	0,87	-0,13	0,64	-0,20	0,31
Lack of knowledge and understanding	3,83	0,94	3,91	0,98	-0,07	0,96	-0,08	0,69
Motivation and coping	4,06	0,61	4,13	0,84	-0,07	0,53	-0,14	0,48
Increased use of motorized transportation	4,37	0,63	4,26	0,86	0,11	0,58	0,19	0,33
Biological factors	3,70	1,10	3,70	1,14	0,00	1,11	0,00	1,00
Lack of time to lead a healthy life	3,63	1,04	3,67	1,21	-0,04	0,85	-0,04	0,82
Lack of policies preventing overweight and obesity	3,93	1,30	3,93	1,24	0,00	0,55	0,00	1,00
Lack of focus on healthy lifestyle among friends and family	4,00	0,88	3,96	0,81	0,04	0,76	0,05	0,80

Paired samples t-test; diff = difference betweel baseline and follow-up score; d = cohen's d; measured from 1=strongly disagree to 5=strongly agree.

Table 3 Comparison of mean values between baseline and follow-up in sample of stakeholders (n=21) participating in the CO-Create dialogue forums.

Factor	Baseline, mean	SD	Follow-up***, mean	SD	diff	SD	d	p
Youth currently play a role in my organization	3,76	1,04	3,76	0,83	0,00	0,84	0,00	1,00
My organization wants to engage youth in its work to further its goals	4,29	0,64	4,05	0,80	0,24	0,70	0,34	0,13
My organization would feel comfortable: Co-operating together with youth as part of a team	4,33	1,02	4,33	0,58	0,00	1,10	0,00	1,00
Asking youth to help work on societal issues we are concerned about	4,43	0,68	4,14	0,79	0,29	0,85	0,34	0,14
My organization practices youth participation in our core activities (n=20)	3,55	1,15	3,60	1,19	-0,05	0,94	-0,05	0,82
My organization is trained to work with young people (e.g., using language easily understood by young people)	3,62	1,02	3,57	0,98	0,05	0,59	0,08	0,72
My organization provides youth with training and/or resources to be able to participate in our core activities	3,43	1,21	3,71	0,96	-0,29	1,01	-0,28	0,21
My organization has allocated budget and staff to ensure, oversee, develop and sustain youth participation	3,24	1,18	3,24	1,34	0,00	0,95	0,00	1,00
I believe that my organization recognises youth participation as a long-term commitment	3,81	0,87	3,81	0,98	0,00	1,00	0,00	1,00
I believe that my organization is prepared to build in changes long term with regardsto youth participation (not just as a one-off undertaking)	3,81	0,87	3,71	0,96	0,10	0,83	0,11	0,61
How many times in the last year have youth participated in core activities of your organization? *	3,33	1,68	3,52	1,69	-0,19	1,44	-0,13	0,55

Comparing youth and stakeholders at baseline for the identical scores showed that the stakeholders scored higher on both readiness for action scores (Advocacy outcome efficacy and Knowledge of resources) (Table 4). Furthermore, they scored higher on 7 out of 9 of the ones on responsibility for

obesity prevention, while there were only 4 out of the 10 drivers of obesity which the stakeholders scored higher than the youth. These four were related to the environment/the system; barriers to healthy food and physical activity opportunities, social media, increased use of motorized transportation and lack of policies preventing overweight and obesity.

Table 4 - Differences between youth and stakeholders in readiness for action and attitudes towards obesity prevention based on the response to the baseline questionnaires.

	Stakeholders (n=52)		**Youth (n=439*)**		
Factor	**Mean**	**SD**	**Mean**	**SD**	**p**
Advocacy outcome efficacy	4,38	0,59	3,19	0,75	**<0,001**
Knowledge of resources	4,42	0,61	3,79	0,77	**<0,001**
Local environment	4,36	0,52	4,06	0,63	**<0,001**
Private business	3,88	0,88	2,88	0,88	**<0,001**
Food and drink industry / business	3,96	1,05	3,39	1,02	**<0,001**
Government / public policy	4,53	0,75	3,51	1,00	**<0,001**
Each individual	4,37	0,74	4,13	0,91	0,08
Schools	4,44	0,64	3,73	1,03	**<0,001**
Companies that help people diet	3,79	1,04	3,77	0,97	0,90
Transportation companies	3,50	0,96	2,63	1,05	**<0,001**
Town and city planners	4,19	0,79	3,36	1,14	**<0,001**
Access to unhealthy food	4,41	0,63	4,22	0,74	0,08
Barriers to healthy food and physical activity opportunities	4,04	0,79	3,58	0,93	**<0,001**
Social media	3,63	0,69	3,06	0,94	**<0,001**
Lack of knowledge and understanding**	3,85	0,97	3,76	0,92	0,51
Motivation and coping	3,99	0,67	4,16	0,67	0,10
Increased use of motorized transportation	4,21	0,72	3,56	1,07	**<0,001**

Biological factors	3,67	0,94	3,63	0,99	0,78
Lack of time to lead a healthy life	3,54	1,09	3,62	1,23	0,64
Lack of policies preventing overweight and obesity	4,04	1,08	3,42	0,97	**<0,001**
Lack of focus on healthy lifestyle among friends and family	3,92	0,84	3,71	0,96	0,13

* Varied slightly; ** n=51; One-way ANOVA; measured from 1=strongly disagree to 5=strongly agree

Reflections

The aim of the CO-CREATE process evaluation of youth and stakeholders was to explore whether there were changes in readiness for action and attitudes towards obesity prevention of both, as well as youth engagement of the stakeholders after being involved in the alliances or the dialogue forums. A few and small changes were found for the youth, but no changes for the stakeholders.

The numbers of participants both of youth in the alliances and the comparison group, and of the stakeholders, were quite low and thus detecting any changes was less likely due to low power. The large variation in participation by country enabled us to only explore the overall changes in the whole sample, which contributed to the heterogeneity in the data. The low number of participants were a combination of challenges with recruitment of youth for the alliances which was prioritized before the recruitment of the comparison group, and then COVID-19 came which caused attrition in the alliances in some countries and challenges with the follow-up measure of the comparison group. Poland was the country which was most successful in recruiting both for the Youth Alliances and comparison group according to the plan, whereas Norway managed to recruit a large baseline sample for the comparison group by visiting the schools, but for the follow-up measure in the spring of 2020 the link to the questionnaire was sent directly to the youth and the teachers were told to remind them, but this resulted in the response rate being only 1/3 of the baseline sample. There were also challenges with getting youth in the alliances to fill in the questionnaire on a monthly basis as this was not done as an alliance activity although the facilitators did reminded them in the meeting and through the other communication channels used. COVID-19 also moved the Dialogue Forums online which made them smaller than intended. Commonly, one idea was discussed in a group of six of which three were stakeholders. In Portugal and Norway, physical Dialogue Forums were held where multiple groups discussed one or more ideas. This is reflected in the higher number of stakeholders from these countries. It was decided that the stakeholder questionnaires should be filled in before and after the Dialogue Forums to be able to keep the forum within 1.5-2 hour. Filling in the baseline questionnaire was followed up before and even at the Dialogue Forums, but response

rate of the follow-up questionnaire was low as the only way to remind the participants was through e-mail.

The validity and reliability of the youth questionnaire was, however, found to be good and the difference in the baseline scores between youth and stakeholders further supports the construct validity as the difference showed higher scores for the stakeholders which could be hypothesized based on their interest in the topic. This further strengthens the confidence that if the numbers had been higher and there had been changes among the alliance members or the stakeholders, the questionnaires would have been able to detect them.

Conclusion

The CO-CREATE process evaluation questionnaire for youth is considered reliable as a tool for measuring adolescents' readiness for action and attitudes toward obesity prevention. The changes in readiness for action or attitudes towards obesity prevention among youth were few and small, but mostly in the expected direction. The adolescents recruited to the Youth Alliances were mostly female, but the alliances managed to retain more of the medium compared with high family affluence youth while the proportion of low family affluence youth remained the same. There were no significant changes in the responses from the stakeholders before and after the Dialogue Forums, but the difference in scores between youth and stakeholders at baseline were in the expected direction and is thus supporting the construct validity of the questionnaires.

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Appendices

Appendix 1: Article from Grewal NK, et al. Assessing adolescents' readiness for action and attitudes toward obesity prevention: Instrument development and psychometric properties. Obes Rev. 2022 Dec 2:e13533.

Appendix 2: Manuscript from Herstad et al. Changes in attitudes and perceived capacity for public and political action related to obesity prevention among adolescents participating in the CO-CREATE Youth Alliances.

Appendix 3: CO-CREATE Baseline youth questionnaire

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Received: 22 May 2022 | Revised: 19 August 2022 | Accepted: 15 October 2022

DOI: 10.1111/obr.13533

SUPPLEMENT ARTICLE

OBESITY Reviews WILEY

Assessing adolescents' readiness for action and attitudes toward obesity prevention: Instrument development and psychometric properties

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Funding information
European Union's Horizon 2020 research and innovation program, Grant/Award Number: 774210

Summary

Engaging adolescents in obesity prevention is a main objective of the CO-CREATE project. This paper presents the development of a questionnaire to assess readiness for action and attitudes toward obesity prevention among adolescents. The questionnaire was developed based on literature searches and internal discussions with experts in the CO-CREATE consortium. The questionnaire was translated, back translated, and pretested for time and comprehensiveness by adolescents from five countries (the Netherlands, Norway, Poland, Portugal, and the United Kingdom). Exploratory factor analysis was performed, and internal reliability of the resulting factors was determined using baseline data from Poland and Norway. Furthermore, test–retest reliability was assessed in a sample of Norwegian adolescents. The exploratory factor analysis on readiness for action identified four factors. Analysis on attitudes toward obesity prevention identified four factors on responsibility and five factors on drivers of behavior. Six of the factors had a Cronbach's alpha value above 0.70, five factors had a value between 0.60–0.70, whereas the remaining two factors were below 0.60. The test–retest correlation ranged from 0.46 to 0.87. The exploratory factor analyzes on readiness for action identified the same factors as hypothesized in the development of the questionnaire, whereas attitudes toward obesity prevention identified more factors than initially assumed. The questionnaire is considered reliable as a tool for measuring adolescents' readiness for action and attitudes toward obesity prevention.

KEYWORDS
adolescents, obesity, prevention, psychometric properties

Abbreviations: CITC, corrected item-total correlation; CO-CREATE, Confronting obesity: Co-creating policy with youth; FAS, family affluence scale; ICC, intra-class correlation coefficient; PAF, principal axis factoring.

1 | INTRODUCTION

Programs to prevent obesity in young people have tended to focus on behavior-oriented prevention programs, mainly school-based, and effects have been limited.[1,2] Combining behavior-based programs with community- or environment-based prevention policies may increase the likelihood of the sustainable success of future obesity prevention programs.

It is important to involve young people in decisions affecting them, especially when it has the potential to enhance promotion of their own health and well-being.[3] In the Confronting obesity: Co-creating policy with youth project (CO-CREATE), which aims to reduce the prevalence of obesity among adolescents in Europe through policy actions to promote a healthier food and physical activity environment, adolescents have not merely been the object of the intervention but have themselves been agents for change by identifying required actions and collaborating to achieve them.[4] The adolescents were involved in participatory action research,[5] which has been found to be an effective tool for young people to address inequalities in various social issues, including health, as well as for promoting civic and political engagement.[6,7]

Although increasing attention is paid to youth involvement and empowerment, there is a dearth of developed and validated measures that can be used to assess adolescents' readiness to engage in action to address obesity and in other intermediary outcomes or process measures within the field of obesity prevention. Some studies have, however, aimed to develop and test such measures, which can be used to evaluate youth advocacy programs,[8] or general measures that can be used to assess youth-led participatory research approaches tackling a wide range of social and community problems.[9] In the present study, a CO-CREATE process evaluation questionnaire was developed to assess to what extent the activities the adolescents participated in influenced their readiness for action and attitudes toward obesity prevention. The underlying hypotheses were that involvement in participatory action research activities would increase the reported readiness for action among participating adolescents, in this case related to primary prevention of overweight and obesity, and that adolescents' participation in a project addressing obesity would lead to a shift in their conceptualization of obesity from a problem grounded at the individual level toward appreciating it as a population-level systems problem. The aim of this paper is to describe the development of this research instrument and to assess the validity and reliability of the questionnaire with respect to readiness for action and attitudes toward obesity prevention.

2 | METHODS

2.1 | Development of the CO-CREATE process evaluation questionnaire

The CO-CREATE process evaluation questionnaire was developed to assess readiness for action and changes in attitudes toward obesity prevention.

De Vet et al.'s six step methods were used for developing the baseline questionnaire; defining and elaborating the constructs intended to be measured, choice of measurement method, selecting and formulating items, scoring issues, pilot testing, and field testing.[10]

Because the study included participants from five different countries (the Netherlands, Norway, Poland, Portugal, and the United Kingdom), the questionnaire was translated from English to Dutch, Norwegian, Polish, and Portuguese following de Vet et al.'s six task methods for translating questionnaires.[10] The questionnaire was back translated into English by a separate translator. To ensure that the questionnaire had the same validity after translation and that cultural issues were considered, a cross-cultural validation was conducted. Cross-cultural validity is defined by Mokkink et al. as "the degree to which the performance of the items on a translated or culturally adopted instrument are an adequate reflection of the performance of items in the original version of the instrument".[11] Translators and developers of the original questionnaires examined thoroughly whether the translated questionnaires were an adequate reflection of the construct, whether the meaning remained the same after translation, and whether the items were relevant.

The questionnaire was pretested in the Netherlands, Norway, Poland, and Portugal, whereas the questionnaire was translated and cross-culturally validated. A total of 17 to 28 adolescents from each country ($n = 90$) participated in the pretest to assess if the pre-final questionnaire was comprehensible and to estimate the duration of completion. The adolescents, aged 16 to 19, were recruited from a school in each country and included adolescents from lower socioeconomic areas. Adolescents participating in the pretest were asked to complete the questionnaire and mark and comment on words/sentences/questions/response alternatives they found to be difficult to understand. Six to eight adolescents from each country ($n = 28$) from the pretest took further part in a cognitive interview after completing the questionnaire. The aim was to understand in detail the adolescents' opinions about the questionnaire's comprehensibility, feasibility, and relevance.[12]

The assessment of the questionnaires' content validity was based on dialogues between translators and developers, written reports from the translation process, and the cognitive interviews with the target group. Extensive field testing beyond translation and cross-cultural validation was not feasible.

2.2 | Measures

A multi-item online questionnaire-based survey suitable for smartphones, tablets, and PCs was developed. Previous studies on either readiness for action or attitudes toward obesity prevention were identified through literature searches. Relevant literature and expert inputs were supplemented by members of the CO-CREATE consortium. Relevant questions and scales for this project were collected in a Microsoft Excel file. Questions originally developed in other surveys and scales that were used were modified to better fit this project. For instance, the item "I feel like I have a pretty good understanding of

the important political issues which confront our society"[9] was modified to "I have a pretty good understanding of important social issues present in my local area." Drafts were made and revised. Articles and reports that were found relevant for developing questions measuring readiness for action and changes in attitudes toward actions to prevent obesity and the final items included in the questionnaire are listed in Appendix A.

The final instrument included 18 items measuring readiness for action (Table 1), with the aim of assessing adolescents' readiness to be involved and engaged in dealing with societal issues. The questions were divided into different concepts based on the literature.[9,13,14] A total of 34 items measured attitudes toward action to prevent obesity. The questions on attitudes toward action to prevent obesity were divided in two concepts: responsibility and drivers of behavior. Items measuring responsibility were further divided into individual (five items) or collective (12 items) responsibility,[15] and drivers of behavior were further divided into two subscales; internal (eight items) and external (nine items) drivers.[16] Dividing the questions in four subscale scores made it possible to track whether the participants thought it was an individual or collective responsibility to reduce the number of people who have overweight or obesity and if they thought unhealthy behavior are dependent on internal or external drivers. For all items, a score from 1 to 5 was given to each item depending on whether the participant *strongly agreed* (5 points) or *strongly disagreed* (1 point).

The baseline questionnaire furthermore included background questions such as birth year, gender, birth country, and socioeconomic position assessed by the family affluence scale (FAS) as well as questions on dietary behaviors and physical activity from the health behavior on school-aged children (HBSC) study.[17,18] These questions were added to provide information to describe the diversity of the participants in CO-CREATE.

2.3 | Data collection

Adolescents from five countries (the Netherlands, Norway, Poland, Portugal, and the United Kingdom) who were part of alliances involved in the CO-CREATE youth alliance activities[4] were invited to complete an online baseline questionnaire in 2019 or 2020. The questionnaire was sent to participants' e-mail addresses or cell phone numbers and it took approximately 10–15 min to complete. A control group from each country was also invited to complete the baseline questionnaire (the UK partner was unable to recruit a control group due to COVID-19). The control groups were recruited through schools. In total, 444 adolescents from the alliances ($n = 159$) and control groups ($n = 285$) completed the baseline questionnaire. The two country baseline questionnaires with the largest sample sizes were chosen to explore the structure of the baseline questionnaire, respectively, the Norwegian ($n = 183$) and Polish questionnaire ($n = 145$).

TABLE 1 Concepts and items included in the CO-CREATE process evaluation questionnaire

Readiness for action
Ways of expressing political voice (6 items)
Competence for civic action (5 items)
Advocacy outcome efficacy (3 items)
Knowledge of resources (4 items)
Attitudes toward action to prevent obesity—responsibility
Responsibility—individual (5 items)
Responsibility—collective (12 items)
Attitudes toward action to prevent obesity—drivers of behavior
Drivers of behavior—internal (8 items)
Drivers of behavior—external (9 items)

2.4 | Test–retest

A test–retest to assess the reliability of the baseline questionnaire was conducted in November 2021 among a group of Norwegian adolescents ($n = 39$) at a school in Oslo. The same group of adolescents answered the baseline questionnaire on two occasions with an interval of 9–14 days.

For all participating adolescents, informed consent was retrieved prior to study participation, and involvement was voluntary. The study protocols were approved by the relevant ethical bodies in each country and for the development study, the main study, the control group, and the test–retest studies separately.

2.5 | Data analysis

Data were stored and analyzed in TSD—services for sensitive data. Background characteristics of the participating adolescents were analyzed. Six questions were included to measure the FAS score: "Does your family own a car, van or truck?", "Do you have your own bedroom for yourself?", "How many computers do your family own?", "How many bathrooms are in your home?", "Does your family have a dishwasher at home?", and "How many times did you and your family travel out of <country> for a holiday/vacation last year?" Each response key was coded from low to high wealth, with 1 being the least of the item in question. The responses on the six questions were summed up to determine the FAS score. A score between 0 and 6 indicated low FAS, 7 thru 9 medium FAS and 10 thru 13 high FAS.

An exploratory factor analysis was performed to determine the structural validity of the constructs (whether the items included in the questionnaire were grouped into the right concepts). Principal axis factoring (PAF) was used to determine the best factor structure to represent each of the three main concepts in the CO-CREATE process evaluation questionnaire: readiness for action, responsibility, and drivers of behavior. Based on the Kaiser criterion, we extracted all factors with eigenvalues higher than one and applied an oblique rotation (direct oblimin method). Items that had factor loadings of 0.40 or higher were considered satisfactory.[19] Analyses were first performed

separately for Norwegian and Polish adolescents and then for the whole sample. Only analyses on the whole sample are presented in order to present a sufficient number of participants in the final analyses.[20] The results show the sub-concepts derived from PAF for each of the three main concepts.

To assess the psychometric properties of the factors derived from the factor analyses, the internal reliability of the factors was calculated by corrected item-total correlation (CITC) and Cronbach's alpha (α). CITC values above 0.30 were considered good,[21] and values that were lower than 0.15 were considered unreliable because that would indicate lack of homogeneity of the items within an item pool.[22] Cronbach's alpha values of 0.70 or higher were considered satisfactory.[21]

Test–retest was assessed on the total score of each factor that derived from PAF, The test–retest reliability was assessed using the intra-class correlation coefficient (ICC) for agreement between the measures. ICC values above 0.70 indicated good reliability and values less than 0.50 indicated poor reliability.[21,23]

The statistical software package IBM SPSS Statistics version 27.0 was used for all the statistical analyses.

3 | RESULTS

3.1 | Background characteristics

Selected characteristics of the respondents are presented in Table 2. A total of 328 Norwegian and Polish adolescents from the alliances and control groups participated in the baseline study. The adolescents were aged between 14 and 23 with a mean age of 16.7 (± 1.0). A higher proportion of females (73%) participated compared with males (26%). Most of the adolescents were born in Norway or Poland. Around 43% were or had previously been active members of a political or nonpolitical organization (e.g., a student government at school and scouts). A 10% of the adolescents had a low FAS score, and 56% had a high FAS score.

3.2 | Factor analysis

Separate analyses were performed for readiness for action, responsibility, and drivers of behavior. There were four factors related to readiness for action; ways of expressing political voice (5 items), competence for civic action (5 items), advocacy outcome efficacy (3 items), and knowledge of resources (4 items) (Table 3). Factor loadings for "ways of expressing political voice" ranged from 0.55 to 0.74, 0.61 to 0.83 for "competence for civic action," 0.45 to 0.64 for "advocacy outcome efficacy," and 0.47 to 0.85 for "knowledge of resources." Mean factor scores ranged from 3.09 to 3.82. One item was not included in the final factor structure (factor loading <0.40) and that was "using social networking platforms to discuss a social issue."

Four factors related to responsibility were found: local environment (4 items), private business (2 items), food and drink industry/business (3 items), and government/public policy (3 items), as shown in Table 4. Mean factor scores ranged from 2.84 to 4.04. Five items had a factor loading below 0.40 and were not included in the final

TABLE 2 Background characteristics of the Norwegian and Polish adolescents ($n = 328$) who completed the CO-CREATE baseline questionnaire

Characteristics	Norway ($n = 183$)	Poland ($n = 145$)	Total ($n = 328$)
Age mean (SD)			
Age at recruitment ($n = 327$)	16.9 (1.1)	16.5 (0.9)	16.7 (1.0)
Gender % (n)			
Male	37 (68)	13 (19)	26 (87)
Female	62 (114)	86 (124)	73 (238)
Prefer not to say	1 (1)	1 (2)	1 (3)
Birth country % (n)			
Norway/Poland	87 (159)	99 (144)	92 (303)
Country within Europe	4 (8)	1 (1)	3 (9)
Country outside of Europe	8 (15)	0 (0)	5 (15)
Active member of a political or nonpolitical organization % (n)			
No, and I have never been	76 (139)	32 (47)	57 (186)
No, but previously	9 (16)	32 (47)	19 (63)
Yes	15 (28)	35 (51)	24 (79)
Family affluence score[a] (FAS) % (n)			
Low FAS	4 (7)	19 (27)	10 (34)
Medium FAS	24 (43)	43 (62)	32 (105)
High FAS	71 (129)	37 (54)	56 (183)

[a]Assessment of socioeconomic position using the family affluence scale (FAS) from the health behavior on school-aged children (HBSC) study.

TABLE 3 Items and factor loadings[a], mean value, standard deviation (SD), corrected item-total correlation (CITC), and Cronbach's alpha (α) for the factors derived from the principal axis factoring reported by adolescents from Norway and Poland in the CO-CREATE baseline study ($n = 328$)[b]

Readiness for action	F1	F2	F3	F4	Mean[c]	SD	CITC	α
Factor 1 (F1): Ways of expressing political voice					3.09	0.89		0.80
I would feel comfortable giving a public talk to a group of people I do not know about a social issue	.74				2.93	1.25	0.61	
Discussing my views in a group of people I do not know about a social issue	.70				3.38	1.10	0.59	
Interviewing adults to learn their perspectives about a social issue	.70				3.53	1.18	0.61	
Contacting (calling or emailing) someone in a position of influence about a social issue	.59				3.07	1.17	0.56	
Doing an interview on radio, TV, or websites about a social issue	.55				2.56	1.28	0.57	
Factor 2 (F2): Competence for civic action					3.41	0.96		0.89
Contact a local newspaper to get them to address a social issue		.61			3.64	1.14	0.64	
Organize a petition to address a social issue		.83			3.62	1.14	0.76	
Organize a meeting to address a social issue		.83			3.40	1.17	0.78	
Organize a demonstration/strike to address a social issue		.76			3.19	1.19	0.71	
Organize a campaign to get local decision-makers to make changes that solve social issues		.78			3.22	1.13	0.74	
Factor 3 (F3): Advocacy outcome efficacy					3.13	0.76		0.65
I have a pretty good understanding of important social issues present in my local area			.64		3.37	0.96	0.50	
I believe I can make a difference in my local area			.45		3.32	1.02	0.42	
I know how policies are made in my local area			.59		2.71	0.99	0.46	
Factor 4 (F4): Knowledge of resources					3.82	0.77		0.78
I know where to find trustworthy information about overweight and obesity				.47	3.83	1.01	0.47	
Prevent overweight and obesity				.70	3.40	1.14	0.63	
Promote healthy diet				.85	3.83	1.00	0.64	
Promote physical activity				.77	4.23	0.79	0.63	

[a]Only items with factor loadings >0.4 are displayed.
[b]Varied slightly for the different factors ($n = 321–327$).
[c]Responses were given on 5-point scales ranging from *strongly disagree* (=1) to *strongly agree* (=5) with a neutral midpoint.

factor structure. These were "each individual," "schools," "companies that help people diet," "transportation companies," and "town and city planners."

Table 5 shows the factors derived from the analyses on drivers of behavior. A total of five factors were identified: access to unhealthy food (3 items), barriers to healthy food and PA opportunities (3 items), social media (2 items), knowledge/understanding (2 items), and motivation and coping (2 items). The mean factor scores ranged from 3.06 to 4.23. "increased use of motorised transportation," "biological factors," "lack of time to lead a healthy lifestyle," "the lack of policies on preventing overweight and obesity," and "lack of focus on healthy lifestyle among friends and family" were not included in the final factor structure (factor loadings <0.40).

3.3 | Internal reliability

Cronbach's alpha was determined to assess internal consistency. Six of the factors satisfied the criterion of 0.70 or higher, ranging from 0.78 to 0.93 (Table 2–4). Five factors had a value between 0.60 and 0.70, and the remaining two factors were below 0.60. The CITC was above 0.30 for 39 of the 41 items. The remaining two items had a value of 0.27.

3.4 | Test–retest reliability

A 39 Norwegian adolescents participated in the test–retest study. The participants were 17 and 18 y old (17.9 ± 0.3). There were 59% males

TABLE 4 Items and factor loadings[a], mean value, standard deviation (SD), corrected item-total correlation (CITC), and Cronbach's alpha (α) for the factors derived from the principal axis factoring reported by adolescents from Norway and Poland in the CO-CREATE baseline study ($n = 328$)[b]

Responsibility	F1	F2	F3	F4	Mean[b]	SD	CITC	α
Factor 1 (F1): Individual/collective—local environment					4.04	0.63		0.63
Family and friends	.54				4.12	0.80	0.39	
The media	.46				4.01	1.01	0.41	
Gyms/leisure centers	.54				4.00	0.89	0.41	
Health care professionals	.45				4.03	0.93	0.45	
Factor 2 (F2): Individual—private business					2.84	0.84		0.67
Employers		.60			2.91	0.93	0.50	
Farmers		.65			2.77	1.01	0.50	
Factor 3 (F3): Collective—food and drink industry/business					3.39	0.98		0.78
Food and drink manufacturers			−.78		3.41	1.28	0.67	
Supermarkets			−.78		3.50	1.18	0.70	
Restaurants			−.46		3.26	1.06	0.52	
Factor 4 (F4): Collective—government (public policy)					3.45	1.02		0.93
The government (national level)				.80	3.42	1.13	0.82	
The government (regional level)				1.03	3.42	1.07	0.92	
The government (local level)				.84	3.51	1.06	0.82	

[a]Only items with factor loadings >0.4 are displayed.
[b]Varied slightly for the different factors ($n = 325–326$).
[c]Responses were given on 5-point scales ranging from *strongly disagree* (=1) to *strongly agree* (=5) with a neutral midpoint.

TABLE 5 Items and factor loadings[a], mean value, standard deviation (SD), corrected item-total correlation (CITC), and Cronbach's alpha (α)for the factors derived from the principal axis factoring reported by adolescents from Norway and Poland in the CO-CREATE baseline study ($n = 328$)[b]

Drivers of behavior	F1	F2	F3	F4	F5	Mean[c]	SD	CITC	α
Factor 1 (F1): External—access to unhealthy food						4.23	0.70		0.63
High access to unhealthy food	.69					4.45	0.80	0.45	
Marketing of unhealthy food	.63					4.16	0.89	0.51	
Unhealthy food is cheap	.45					4.09	1.06	0.38	
Factor 2 (F2): External—barriers to healthy food and PA opportunities						3.56	0.94		0.63
Limited access to healthy food		.50				3.74	1.27	0.52	
Limited access to physical activity opportunities		.42				3.29	1.35	0.47	
Limited financial resources		.67				3.64	1.10	0.34	
Factor 3 (F3): Internal/external—social media						3.06	0.98		0.48
Being overweight is the new normal			−.55			2.68	1.33	0.32	
Influence from social media			−.53			3.43	1.08	0.32	
Factor 4 (F4): Internal—knowledge/understanding						3.82	0.86		0.80
Lack of knowledge about risk of obesity due to lifestyle choices				−.81		3.76	0.93	0.66	
Lack of understanding of the risk associated with obesity				−.83		3.88	0.95	0.66	
Factor 5 (F5): Internal—motivation and coping						4.18	0.67		0.42
Insufficient personal motivation to act upon knowledge					.52	4.23	0.78	0.27	
Unhealthy coping strategies to stress					.45	4.13	0.89	0.27	

[a]Only items with factor loadings >0.4 are displayed.
[b]Varied slightly for the different factors ($n = 326–328$).
[c]Responses were given on 5-point scales ranging from *strongly disagree* (=1) to *strongly agree* (=5) with a neutral midpoint.

and 41% females participating. Only 10% of the participating adolescents were or had previously been active members of a political or non-political organization. A total of 85% of the participants had a high FAS, and 5% had a low FAS. Table 6 shows the test–retest reliability that was assessed using ICC. The results ranged from 0.46 to 0.87. Seven of the 13 factors had an ICC score above 0.70. One of the factors had a value below 0.50 and that was "ways of expressing political voice."

4 | DISCUSSION

The present study describes the development of the CO-CREATE process evaluation questionnaire and psychometric properties. To our knowledge, this is one of the few studies assessing readiness for action and attitudes toward obesity prevention among adolescents participating in youth-led participatory action research. The process evaluation questionnaire was developed to assess adolescents' readiness to be involved and engaged in dealing with societal issues (in this case obesity) before, during, and after attending activities in CO-CREATE and also to assess if the participation of adolescents in addressing the problem of obesity included a shift in their conceptualization of obesity from an individual problem to a structural or systems problem. A standardized process was followed in the development phase,[10] and our analysis of the questionnaire demonstrated satisfactory results for internal consistency and test–retest reliability.

Exploratory factor analysis identified a total of 13 factors. Items belonging to readiness for action had been divided into different concepts based on the literature.[9,13,14] Due to inconsistency in the ways in which action items were categorized into different concepts in the literature, assigning items to a concept was challenging when developing the questionnaire. However, readiness for action identified four factors that had the same structure as planned for in the development phase. The item "using social networking platforms to discuss a social issue," which was adapted from King et al.[14] had a factor loading below 0.40. The use of social media has grown rapidly and has become an integrated part of daily life. The most active users of social media are adolescents and young adults,[24] and it is also a platform for civic expression and political participation.[25,26] Based on this, the item is considered to be useful to include as a single question in the questionnaire although it did not fit in the factor "ways of expressing political voice."

Responsibility was divided into individual and collective responsibility based on the NHS Health Scotland survey.[15] The Scottish Social Attitudes survey has run annually since 1999; however, the questions in the obesity module in the 2016 survey, which was developed in consultation with NHS Health Scotland had not been asked previously. A number of these questions were derived from the 2015 British Social Attitudes survey,[27] and some were tested on members of the general public to ensure understanding by those of different genders, ages, and employment status.[15] Analyses on this concept resulted in four factors. Three of the items with factor loadings below 0.40 derived from the NHS Health Scotland survey: "each individual," "schools," and "companies that help people diet." According to the NHS Health Scotland survey, a large proportion of the respondents found individuals, schools, and companies responsible for tackling obesity, 85%, 57%, and 25%, respectively.[15] The remaining two items with a loading below 0.40 was included after consultation with the CO-CREATE consortium members: "transportation companies" and "town and city planners." The reason for adding these was to address

TABLE 6 Mean value, standard deviation (SD) and intra-class correlation coefficient (ICC) for each factor in the test–retest among Norwegian adolescents ($n = 39$)[a]

	Test		Retest		
Factor	Mean	SD	Mean	SD	ICC
Readiness for action					
Ways of expressing political voice	3.29	0.92	3.17	0.82	0.46
Competence for civic action	2.91	1.12	2.62	1.11	0.77
Advocacy outcome efficacy	3.18	0.93	3.13	0.89	0.76
Knowledge of resources	3.99	1.10	4.19	0.87	0.86
Responsibility					
Individual/collective—local environment	4.22	0.73	3.76	0.76	0.61
Individual—private business	2.71	1.22	2.51	1.01	0.72
Collective—food and drink industry/business	3.36	1.21	3.08	1.19	0.63
Collective—government	3.68	1.08	3.44	1.18	0.67
Drivers of behavior					
External—access to unhealthy food	3.91	1.00	3.65	0.99	0.83
External—barriers to healthy food and PA opportunities	3.43	1.05	3.38	1.23	0.84
Internal/external—social media	2.67	1.17	2.74	1.08	0.87
Internal—knowledge/understanding	3.47	1.33	3.28	1.17	0.68
Internal—motivation and coping	3.97	0.95	3.55	1.08	0.55

[a]Varied slightly for the different factors ($n = 36$–39).

not only the food environment but also the physical activity environment, as both are relevant for obesity.[28]

Drivers of behavior were divided into internal and external drivers based on the obesity perception and policy survey, a multicountry review and survey of policymakers in 2014.[16] Five factors derived from the analyses, and two of the items with factor loading below 0.40 ("biological factors" and "lack of time to lead a healthy lifestyle") were from the survey, and the remaining three ("increased use of motorised transportation," "the lack of policies on preventing overweight and obesity," and "lack of focus on healthy lifestyle among friends and family") were added after discussions with the CO-CREATE consortium.

Both concepts on attitudes toward obesity prevention identified more factors than anticipated. This may be due to the multiple dimensions of obesity such as genetics, individual behavior, and physical and social environments. The new factors on responsibility may point to beliefs that responsibility for obesity lies with the local environment, private business, or government, and the factors on drivers of lifestyle choices may be related to beliefs accessibility, barriers to healthy food and physical activity opportunities, social media, knowledge, or personal motivation are drivers of behavior. Items with factor loadings below 0.40 may however be relevant to include as single items in the questionnaire, and further testing of the structure should be considered.

The internal consistency of the factors was found to be satisfactory for six factors (0.70). Two factors had a value below 0.6, and these belonged to the concept drivers of behavior ("social media" and "motivation and coping"). A low alpha could be due to a low number of questions, poor interrelatedness between the items or heterogeneous constructs, and if it is low due to poor correlation between items, then some should be revised or discarded.[29] None of the items had a CITC below 0.15, which could indicate that the low number of items in these two factors (two items) may be one of the reasons for the low alpha.

The test–retest showed good or adequate reliability between most of the factors. "Ways of expressing political voice" had an ICC value lower than 0.50. A possible explanation may be that the participants are young and may have difficulty understanding the concept as the participants responding to the test–retest questionnaires did not participate in any CO-CREATE activities. Also, the background characteristics of the participants showed that only a few of the participating adolescents were or had previously been active members of a political or nonpolitical organization.

4.1 | Strengths and limitations

Strengths of the present study are that a thorough step-by-step approach was employed to develop a questionnaire to assess readiness for action and attitudes toward obesity prevention among adolescents across five countries. Web-based surveys have several advantages, such as easy and rapid communication, lower delivery costs, and limited need for data entry,[30] and they may be an easier way to reach adolescents, who tend to be active users of smartphones, tablets, and PCs. Furthermore, throughout the analyses, there were only a few participants with missing data. There are also some limitations concerning this study. Reliability of factor analysis depends on the sample size.[21] Correlation coefficients may fluctuate from sample to sample, and this is much more the case in small samples than large. There are many "rules of thumb," but a sample of 300 or more when performing factor analysis could probably provide a stable factor solution.[20,21] The ideal would have been to perform factor analysis on each country separately; however, due to small sample sizes, exploratory factor analysis was performed using baseline data combined from Poland and Norway only to avoid potential heterogeneity due to country of origin. Information about adolescents who were invited but did not give a response or actively declined to participate was not registered or collected, so it was not possible to assess response rate or selection bias. However, a high proportion of participating adolescents belonged to a high socioeconomic status group based on the FAS score, especially in the test–retest study, which may indicate a lack of diversity among the participating adolescents.

Another limitation may be that the response categories for all items ranged from *strongly agree* to *strongly disagree*. There may have been a mismatch between the response categories, and some of the items included in the questionnaire, making it difficult for the adolescents to answer the questions.

Overall, our findings identified more factors than had been anticipated would be useful for measuring readiness for action, responsibility, and drivers of behavior among adolescents. Further research should be conducted to study these factors to strengthen the reliability and validity of these measures. Nevertheless, this study contributes to the development of measures that can be used to assess adolescents' readiness for action and attitudes within the field of obesity prevention. The measures developed can possibly be adapted by other youth involvement programs working with other complex social issues.

5 | CONCLUSION

The presented study is one of the few studies assessing readiness for action and attitudes toward obesity prevention among adolescents participating in youth-led participatory action research. The study provides insight on the development of the CO-CREATE process evaluation questionnaire and the items measuring readiness for action, responsibility, and drivers of behavior. Analyses on readiness for action identified the same factors as hypothesized, whereas some modifications on responsibility and drivers of behavior should be considered. The questionnaire and the items included is considered valid and reliable as a tool for measuring adolescents' readiness for action and attitudes toward obesity prevention.

ACKNOWLEDGMENTS

We would like to acknowledge and thank all the young people who participated in this study. The CO-CREATE project has received

funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 774210. The content of this paper reflects only the authors' views, and the European Commission is not liable for any use that may be made of the information it contains.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Knut-Inge Klepp, Christian Bröer, Aleksandra Luszczynska, Harry Rutter, and Nanna Lien were involved in designing the CO-CREATE study. Helene Holbæk developed the questionnaire, whereas Anna Banik, Aleksandra Luszczynska, Christian Bröer, Talia Macauley, Harry Rutter, and Nanna Lien were actively involved in the process including pretesting and translation. Navnit Kaur Grewal, Anna Banik, Helene Holbæk, and Talia Macauley conducted the data collection. Navnit Kaur Grewal drafted the paper and was responsible for the analyses. Knut-Inge Klepp and Nanna Lien contributed to the conceptualization of the paper and the interpretation of the analysis. All authors reviewed the paper and contributed to the content. All authors read and approved the final manuscript.

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How to cite this article: Grewal NK, Klepp K-I, Banik A, et al. Assessing adolescents' readiness for action and attitudes toward obesity prevention: Instrument development and psychometric properties. *Obesity Reviews*. 2022;e13533. doi:10.1111/obr.13533

APPENDIX A

Relevant articles for developing questions measuring readiness for action and changes in attitudes toward obesity prevention and the final items included in the questionnaire

Readiness for action	Reference[1–3]
Ways of expressing political voice	
I would feel comfortable giving a public talk to a group of people I do not know about a social issue	Ozer EJ & Schotland M.[9]
Discussing my views in a group of people I do not know about a social issue	Flanagan CA, Syvertsen AK, Stout MD.[13]
Using social networking platforms to discuss a social issue	King et al.[14]
Interviewing adults to learn their perspectives about a social issue	Ozer EJ & Schotland M.[9]
Contacting (calling or emailing) someone in a position of influence about a social issue	Flanagan CA, Syvertsen AK, Stout MD.[13]
Doing an interview on radio, TV, or websites about a social issue	King et al.[14]
Competence for civic action	
Contact a local newspaper to get them to address a social issue	King et al.[14]
Organize a petition to address a social issue	Flanagan CA, Syvertsen AK, Stout MD.[13]
Organize a meeting to address a social issue	Flanagan CA, Syvertsen AK, Stout MD.[13]
Organize a demonstration/strike to address a social issue	Question added after discussion with CO-CREATE consortium
Organize a campaign to get local decision-makers to make changes that solve social issues	King et al.[14]
Advocacy outcome efficacy	
I have a pretty good understanding of important social issues present in my local area	Ozer EJ & Schotland M.[9]
I believe I can make a difference in my local area	Flanagan CA, Syvertsen AK, Stout MD.[13]
I know how policies are made in my local area	Ozer EJ & Schotland M.[9]
Knowledge of resources	
I know where to find trustworthy information about overweight and obesity	Question added after discussion with CO-CREATE consortium
Prevent overweight and obesity	Constance A. Flanagan, A. K. S., and Michael D. Stout[13]
Promote healthy diet	Question added after discussion with CO-CREATE consortium
Promote physical activity	Question added after discussion with CO-CREATE consortium
Attitudes—responsibility	**Reference[4,5]**
Individual	
Each individual	NHS Health Scotland[15]
Family and friends	NHS Health Scotland[15]
Health care professionals	NHS Health Scotland[15]
Employers	NHS Health Scotland[15]
Farmers	Question added after discussion with CO-CREATE consortium

Attitudes—responsibility	Reference[4,5]
Collective	
Schools	NHS Health Scotland[15]
The media	NHS Health Scotland[15]
Gyms/Leisure centers	NHS Health Scotland[15]
Companies that help people diet	NHS Health Scotland[15]
Food and drink manufacturers	NHS Health Scotland[15]
Supermarkets	NHS Health Scotland[15]
Restaurants	NHS Health Scotland[15]
Transportation companies	Question added after discussion with CO-CREATE consortium
Town and city planners	Question added after discussion with CO-CREATE consortium
The government (national level)	Tompson et al.[31]
The government (regional level)	Tompson et al.[31]
The government (local level)	Tompson et al.[31]
Attitudes—drivers of behavior	**Reference[6]**
Internal	
Increased use of motorized transportation	Question added after discussion with CO-CREATE consortium
Being overweight is the new normal	European Association for the Study of Obesity[16]
Biological factors	European Association for the Study of Obesity[16]
Lack of knowledge about risk of obesity due to lifestyle choices	Question added after discussion with CO-CREATE consortium
Lack of understanding of the risk associated with obesity	European Association for the Study of Obesity[16]
Insufficient personal motivation to act upon knowledge	European Association for the Study of Obesity[16]
Lack of time to lead a healthy lifestyle	European Association for the Study of Obesity[16]
Unhealthy coping strategies to stress	Question added after discussion with CO-CREATE consortium
External	
High access to unhealthy food	European Association for the Study of Obesity[16]
Limited access to healthy food	European Association for the Study of Obesity[16]
Marketing of unhealthy food	European Association for the Study of Obesity[16]
Limited access to physical activity opportunities	European Association for the Study of Obesity[16]
Limited financial resources	European Association for the Study of Obesity[16]
The lack of policies on preventing overweight and obesity	Question added after discussion with CO-CREATE consortium
Unhealthy food is cheap	Question added after discussion with CO-CREATE consortium
Influence from social media	Question added after discussion with CO-CREATE consortium
Lack of focus on healthy lifestyle among friends and family	Question added after discussion with CO-CREATE consortium

Appendix 2: Manuscript from Herstad et al. Changes in attitudes and perceived capacity for public and political action related to obesity prevention among adolescents participating in the CO-CREATE Youth Alliances.

Title of the article:

Changes in attitudes and perceived capacity for public and political action related to obesity prevention among adolescents participating in the CO-CREATE Youth Alliances

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Abbreviations:

CO-CREATE	Confronting obesity: co-creating policy with youth
FAS	Family affluence scale
PAR	Participatory action research
WHO	World health organization
YPAR	Youth-led participatory action research

Keywords:

Obesity; questionnaire; adolescents; prevention; engagement; empowerment; youth-led participatory action; Europe

Acknowledgements:

We would like to acknowledge and thank all the young people who participated in this study. The CO-CREATE project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 774210. The content of this paper reflects only the authors' views, and the European Commission is not liable for any use that may be made of the information it contains.

Conflict of interest:

The authors declare no conflict of interest.

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Abstract

Aim

The aim of this study was to assess any effects on adolescents' reported readiness to engage with obesity as a societal issue, conceptualization of obesity in terms of personal or societal responsibility, and perceived drivers of behaviour before, during, and after participating in participatory action research-based activities and policy design.

Method

This was a quasi-experimental study, where adolescents came together with researchers in their respective countries (the Netherlands, Norway, Poland, Portugal, and the U.K) and formed 15 Youth Alliances to co-create policy ideas for obesity prevention. At baseline and through monthly measurement points, the participants completed an online questionnaire, measuring readiness for action (18 items), and attitudes towards obesity prevention – responsibility and drivers of behaviour (34 items). A comparison group (n=280) with similar socio-demographic profile was recruited and assessed twice. We created two sub-samples from the total sample (n=439) at baseline. Sub-sample 1 included Youth Alliance members who responded to the questionnaire at baseline, and at a measurement point prior to the COVID-19 lockdown (n=90) as intermediary effects (after 2-3 months). Sub-sample 2 included Youth Alliance members who responded to the questionnaire at baseline and upon completion (n=72). Adolescents from the comparison group who completed both surveys (n=123) were included in both sub-samples. We used a two-level linear mixed model to control for country variance to assess the effects in the two sub-samples.

Results

In sub-sample 1, Alliance members scored significantly higher than the comparison group on the responsibility of “government/public policy” (b = 0.56, 95% CI = 0.11, 1.01), and on “social media” (b = 0.50, 95% CI = 0.08, 0.91) as a driver of behaviour at follow-up. In sub-sample 2, Alliance members scored significantly higher than the comparison group upon completion on “using social networking platforms to discuss a social issue” (b = 0.62, 95% CI = 0.21, 1.03), responsibility of “private business” (b = 0.50, 95% CI = 0.15, 0.85) and “transportation companies” (b = 0.42, 95% CI=0.02, 0.82), and on “lack of knowledge/understanding” (b = 0.37, 95% CI = 0.06, 0.67) and “lack of focus on healthy lifestyle among friends and family” (b

= 0.44, 95% CI = 0.00, 0.87) as drivers of behaviour. Significant interactions between group and time between baseline and follow-up were found for “advocacy outcome efficiency (b = -0.04, 95% CI= -0.07, -0.00) and “each individual” (b = -0.06, 95% CI = -0.12, -0.00) in sub-sample 1, and for “government / public policy” (b = -0.05, 95% CI = -0.09, -0.01) in sub-sample 2.

Conclusion

Intermediary effects in sub-sample 1 showed that Alliance members scored higher than the comparison group on two factors. Upon completion, Alliance members in sub-sample 2 scored higher than the comparison group on two factors and 3 single-items. The effects were mainly in the expected direction.

Introduction

To address the public health challenge of obesity among adolescents, there is a need to approach obesity as a systemic challenge (1), resulting from the interplay of social, economic, environmental, biological, and individual drivers (2). The World Health Organization (WHO) (3) have thus called for a "whole-of-society" approach (4), and consequently to move beyond individual-level interventions, and towards policies that can influence the systems which shapes the obesogenic environments (1).

Engaging and empowering youth at local, national, and international levels to be agents for change through policies, may be required to effectively address and change the obesogenic systems surrounding adolescents (5, 6). Capacity building seem to be an integral aspect of empowering adolescents, as well as for ensuring readiness to be involved and act upon societal issues, such as development of obesity prevention policies targeting adolescents (7).

Few validated measures to assess adolescent's readiness for action to prevent obesity have been developed (8). Previous literature have, however, proposed that empowered outcomes should include changes in attitudes and beliefs (9), and reflect key intra- and interpersonal and behavioural dimensions (9-11). In Grewal et al. (6), readiness for action encompassed several aspects required to act, such as "ways of expressing political voice", "competence for civic action", "advocacy outcome efficacy", "knowledge of resources", and "using social networking platforms to discuss a social issue" (6). Accordingly, programs that focus on youth involvement should develop communication skills (12), increase motivation to influence, improve socio-political skills and understanding of the environment, and inspire to participatory behaviour (13, 14).

A promising approach is the involvement of adolescents in policy research through youth-led participatory actions research (YPAR), a form of participatory action research (PAR) (12, 14). PAR is "a cooperative, iterative process of research and action in which non-professional community members are trained as researchers and change agents, and power over decisions are shared among the partners in the collaboration" (14, 15). Recent literature has reported on several benefits of YPAR, such as improved research quality and adolescent`s empowerment (16), as well as successful promotion of civic and political engagement (14, 17).

Among socially disadvantaged groups, where unhealthy behaviours (18) and obesity is generally more prominent (19), YPAR holds particular promise to facilitate youth development and civic participation (14). Furthermore, as meaningful engagement of youth is necessary to represent their situated experience (5, 16), it is important to include youth from diverse social backgrounds to ensure the relevance and acceptability of policies (20). Although promising, youth advocacy for obesity prevention among adolescents is a novel strategy (8, 21), and despite increasing attention to youth involvement (6), they are rarely involved in PAR (22).

Few studies have addressed adolescent`s attitudes towards overweight and obesity (6). The majority suggested that adolescents perceive overweight and obesity as a health issue that can be addressed through healthy lifestyle (14), and the responsibility for obesity prevention was placed accordingly on the individual (6). However, some evidence for ascribing collective responsibility for obesity was found in a study from Australia (10). Furthermore, in a study from Spain and the U.K. (6), most adolescents argued for the responsibility of schools to provide nutritional knowledge, and for governments to implement preventive obesity policies. Individual irresponsibility (23) and internal factors, e.g., lack of willpower, self-discipline, and motivation (24), are still commonly perceived as the main drivers of obesity. Sikorski et al. (25) proposed that this focus on individual responsibility have reduced the support for broad-based preventive measures, while Bauman et al. (26) stated that it has skewed obesity policies towards individual-level factors. Accordingly, an YPAR approach to obesity prevention should also address attitudes towards obesity and preventive measures, shifting the thinking of the issue from being solely an individual responsibility to being seen as a systemic political issue (1, 7).

The Confronting obesity – co-creating policy with youth (CO-CREATE) project aims to reduce the prevalence of obesity among adolescents, by combining the knowledge of adolescents, scientist and stakeholders in the joint development of policy ideas (7). In CO-CREATE, adolescents have formed groups of young people – called Youth Alliances - where they worked towards a common goal. The goals of the Alliances should serve to “promote and support adolescent participation and political efficacy and develop transferable, novel, context-specific and science- and experience-informed policy options that would contribute to complex system-informed overweight and obesity prevention” (7). To facilitate this, CO-

CREATE developed a Youth Alliance Activity Handbook with activities based on PAR, that local staff and Youth Alliance members could adapt and implement in their alliances (7).

In the present study, we have assessed self-reported readiness for action and attitudes towards obesity and preventive measures in a sample of European adolescents participating in the CO-CREATE Youth Alliances. Furthermore, as CO-CREATE set out to recruit youth from diverse social backgrounds (7), we aimed to assess the demographic profile of the Alliances and if it changed throughout the Alliance period. This was explored through the following research questions:

1) Were there intermediary effects of the Alliance activities on adolescents` reported readiness for action and their attitudes towards obesity and preventive measures, compared to a comparison group?

2) Were there effects after completing the Alliance activities on adolescents` reported readiness for action and their attitudes towards obesity and preventive measures, compared to a comparison group?

3) Did the demographic profile of those completing the Alliance activities differ from those who participated at baseline?

Method

Study design and data collection

This was a cross-national, multicenter, and non-randomized controlled trial. The CO-CREATE Youth Alliance intervention aimed to set up in total 15 Alliances of 15-20 adolescents in each – in five European countries; the Netherlands, Norway, Poland, Portugal and the U.K. To recruit youth from various social backgrounds, an urban and a rural geographical area were identified in each country. The local and national context were explored to identify, "(1) categories of adolescents likely to be less represented in the local public scene; (2) suitable local/national organizations to act as gatekeepers and to assist CO-CREATE researchers to reach out to and enroll the targeted adolescents along four entry points (i.e., schools, municipalities, existing youth organizations and community-based organizations); and (3) suitable organizations for providing co-facilitators" (7).

The CO-CREATE project recruited adolescents aged 16-18 years old from schools and existing youth organizations, who agreed to take part in the Alliance activities, including participating in regular meetings, engage in capacity building training, and actively search for and obtain information about systemic factors that affect health-related lifestyles (7). In total, 199 youth participated in the 15 Youth Alliances. A comparison group (n = 280) was recruited through schools (6) with a similar socio-demographic profile as the areas where the Youth Alliance participants were recruited from. The adolescents in the comparison group were recruited from Norway (55%), Poland (30%), Portugal (9%), and the Netherlands (6%), and was not involved in any co-creation related activities.

The CO-CREATE Youth Alliances recruitment was mainly conducted between September 2019 and January, but one Alliance had their first meeting in March 2020. Following the COVID-19 lockdown in March 2020, all Alliances had to move their activities to an online platform. A Youth Alliance protocol served as a starting point and offered a general outline of activities, such as group building, photovoice, system mapping, policy forms, capacity building, advocacy training, and budgeting. The activities were based on PAR, with the aim to engage and empower youth. In line with the objective of CO-CREATE, youth members co-decided on the activities and forms of the Alliance. The underlying assumption was that participation in the Youth Alliances would lead to a change in the participants' readiness for action, and a shift in their attitudes towards obesity as an issue of individual-level drivers and responsibility to a systemic challenge. Frequency of meetings varied from a small number (6-8 meetings) of long sessions to a large number (≥20) of shorts sessions depending on the Alliances preferences. A facilitator and a co-facilitator were trained and assigned to each Alliance. A detailed description of the various Youth Alliances and activities is described elsewhere (7).

Youth Alliance members were invited to complete the CO-CREATE process evaluation questionnaire prior to their first Alliance meeting. Following the start of the Alliance, participants were requested fill in the questionnaire at a monthly basis. The first follow-up questionnaires were mainly sent out between October 2019 and January 2020 depending on the time of the Alliance`s first meeting. One Alliance responded to their first follow-up questionnaire in October 2020. The participants were also invited to complete the follow-up questionnaire approximately 6 months after the end of the Alliances. Frequency of measurement points and number of responses varied between the countries and Alliances.

Time of baseline-, measurement points-, and follow-up responses in all Alliances is presented in **Figure 1**. The comparison group was invited to complete the baseline questionnaire twice, in the period November 2019 – February 2020 and again in May – June 2020. Informed consent from all participating adolescents was retrieved prior to study participation and involvement was voluntary. In Poland and Portugal, consent was retrieved from parents of adolescents who were younger than 18 years old. The relevant ethics committees from the respective country approved the study protocols.

The CO-CREATE process evaluation questionnaire and measures

The CO-CREATE process evaluation questionnaire is a multi-item online questionnaire and was developed to assess whether involvement in the CO-CREATE Youth Alliances influenced reported readiness for action and attitudes towards obesity and preventive measures among the participants (6). The questionnaire included 18 items measuring the readiness for action concept. Attitudes towards obesity prevention were covered by two concepts – "responsibility" and "drivers of behaviour" – measured by 34 items. The concepts and items chosen to measure adolescents readiness for action and attitudes towards obesity prevention were based on previous literature (12-14, 27) and expert inputs from members of the CO-CREATE consortium (6). A detailed description of the questionnaire, and its development, reliability, and validity is described in Grewal et al. (6) which also defined the best factor structure for all three concepts. The readiness for action concept included four factors, "ways of expressing political voice", "competence for civic action", "advocacy outcome efficacy", and "knowledge of resources", and one single-item, "using social networking platforms to discuss a social issue". Responsibility were related to four factors, "local environment", "private business", "food and drink industry / business", and "government / public policy", and five single-items, "each individual", "schools", "companies that help people diet", "transportation companies", and "town and city planners". The drivers of behaviour concept included five factors, "access to unhealthy food", "barriers to healthy food and physical activity opportunities", "social media", "lack of knowledge and understanding", and "motivation and coping", and five single items, "increased use of motorized transportation", "biological factors", "lack of time to lead a healthy life", "lack of policies preventing overweight and obesity", and "lack of focus on healthy lifestyle among friends and family". All items were measured on 5-point Likert scale from strongly disagree to strongly agree. The baseline

questionnaire also included items on background information, such as age (reported year and month of birth), sex ("boy", "girl", or "prefer not to say") and socioeconomic status assessed by the Health Behaviour in School-aged Children's Family Affluence Scale (FAS) (28). The FAS is measured as the sum score from the response to six items: "Does your family own a car, van, or truck", "Do you have your own bedroom for yourself", "How many computers do your family own", "How many bathrooms are in your home", "Does your family have a dishwasher at home", and "How many times did you and your family travel out of <country> for a holiday/vacation last year". The FAS sum score (range 0 to 13), was divided into three categories, where scores from 0 to 6 indicated low family affluence, 7 through 9 medium family affluence, and from 10 to 13 high family affluence.

Statistical analysis

Data were directly stored from the online questionnaires and analyzed in services for sensitive data (TSD) at the University of Oslo, Norway. We calculated the factor score as the sum score of items within that factor divided by the number of items in the factor. If a participant had responded to more than 50%, but less than 100% of the items within a factor, the mean factor score was calculated from items answered. The group variable assigned the participants to a comparison group (=0) or the Alliance (=1). Time between baseline and follow-up response was calculated in weeks. Age at baseline was calculated from reported month and year of birth, with the day of birth set to the 15th for all participants. Participants who reported "prefer not to say" (n = 3) to the sex item were set to missing and excluded from the respective analysis.

Participants without a baseline or a follow-up response were excluded. This led to the exclusion of more than half (n = 157) of the participants, respectively 128 and 29 participants from the comparison group and Youth Alliances group. Descriptive analysis and independent samples t-tests were used to describe the baseline data (n=439) and compare mean values of age, sex, family affluence, and all factors and single-items measuring readiness for action and attitudes towards obesity prevention. Chi-squared test were used to assess any difference in proportions of sex and family affluence between Alliance members at baseline and upon completion. Descriptive data is presented as the mean with SD unless otherwise stated. Pearson's r was used to assess the correlation between age, family affluence, and factors within readiness for action and attitudes towards obesity and preventive measures.

We created two sub-samples for the multilevel analysis of effects. Sub-sample 1 (n = 213) included a comparison group (n = 123) with adolescents who completed the questionnaire twice, and all participants from the Alliances with a baseline response, and a completed questionnaire from a measurement point prior to the COVID-19 lockdown. Time between baseline and follow-up responses ranged from one week to six months, with a mean of 16 weeks. With this sample we aimed to explore any intermediary effects of the Alliance activities on adolescents' readiness for action and attitudes toward obesity prevention (research question 1). As we only included responses completed prior to the COVID-19 lockdown, we assumed that the results here would be unaffected by any influences of the COVID-19 situation. Sub-sample 2 (n = 195) included the same comparison group, and all participants from the Alliances with a baseline response, and a completed questionnaire from the last measurement point or the post-Alliance follow-up. This was to explore the effects upon completion of the Alliances on reported readiness for action and attitudes toward obesity and preventive measures (research question 2). Time between baseline and follow-up responses ranged from 3 months to 18 months, with a mean of 26 weeks. For both samples, if a participant had completed more than one follow-up questionnaires, the first completed questionnaire was chosen. In total, 113 adolescents from the Alliances were included in either sub-sample 1 or 2, and 49 were included in both sub-samples. The comparison group were the same in both sub-samples.

We calculated the intra-class correlation coefficient (ICC) for all outcome variables to assess how much of the total variation were attributed to country effects. Significant clustering effects (ICC > 0.05) were found on 17 out of 24 factors in the "null" model in sub-sample 1, and on 15 factors in sub-sample 2. After adjusting for group, baseline score, time between baseline and follow-up response, age, sex, and family affluence, clustering effects were found for 12 factors in sub-sample 1, and 14 factors in sub-sample 2. Thus, we fitted a two-level linear mixed model with random effects for country as clusters at the upper-level. The model included four steps, where step 1 was the "null" model without any covariates. In step 2, we added group (Comparison=0, Alliance=1) as a level 1 independent variable. In step 3, baseline score, time between baseline and follow-up response, age, sex, and family affluence were added as level 1 covariates. In step 4, we added the interaction between group and time between baseline and follow-up response as a covariate. Fixed effects were estimated for

group and covariates in steps 2-4. All statistical analyses were performed in IBM SPSS statistics 27.0, and significance level was set to $p < 0.05$.

Results

Baseline characteristics of sex, age, and family affluence

Baseline characteristics of the participants (n = 439) are presented in **Table 1**. In total, 159 adolescents from the CO-CREATE Youth Alliances, and 280 adolescents from the comparison group responded to the baseline questionnaire. The participants were aged between 14 and 23 years old, with a mean age of 17.1 (1.0) years. Of the total sample, 72% were female, 50% were in the high family affluence category, and 11% were in the low family affluence category.

Sub-sample 1 (n=213) included 90 adolescents from the Youth Alliances and 123 adolescents from the comparison group. In sub-sample 2 (n=195), 72 adolescents were Youth Alliance members. In sub-sample 1, 59% of the adolescents were recruited in Poland, while 52% of the adolescents in sub-sample 2 were recruited in Poland. The mean age was 16.9 (0.9) years old in sub-sample 1 and 16.9 (1.0) years old in sub-sample 2. In sub-sample 1, 77% were females, while 76% were females in sub-sample 2. The proportion of adolescents from high family affluence were 43% in sample 1, and 32% in sample 2, while respectively 18% and 15% were in the low family affluence category. The demographic profile of Alliance members was similar between participants at baseline and in sub-sample 2 (**Table 2**).

Baseline comparison of mean values of sex, age family affluence, and factors within the readiness for action, responsibility, and drivers of behaviour concepts between Youth Alliance members and the comparison group

Comparison of mean values at baseline between participants in the Alliances and the comparison group is presented in **Table 3**. Mean values of age and sex were similar in both groups, while adolescents in the comparison group reported higher family affluence compared to those from the Alliances. Within the readiness for action concept, the Alliance group scored higher than the comparison group on three factors and a single-item; “ways of expressing political voice”, “competence for civic action”, “advocacy outcome efficacy”, and “using social networking platforms to discuss a social issue”. Within the responsibility concept, the Alliance members scored higher than the comparison group on “private business”, “government / public policy”, “schools”, and “companies that help people diet”. Adolescents

from the Youth Alliances perceived "barriers to healthy food and physical activity opportunities", "social media", and "lack of policies preventing overweight and obesity" as more important drivers of behaviour than participants in the comparison group. The overall effect sizes ranged from -0.64 to 0.38.

In sub-sample 1, Alliance members scored higher on "ways of expressing political voice", "competence for civic action", "government / public policy", "companies that help people diet", "social media", and "lack of policies preventing overweight and obesity", at baseline. In sub-sample 2, differences in baseline scores between the Alliance and comparison group were found for "ways of expressing political voice", and "social media". In both sub-samples, Alliance members scored lower on "each individual". The overall effect sizes ranged from -0.62 to 0.31 in sub-sample 1, and from -0.88 to 0.06 in sub-sample 2.

Correlation between age, family affluence and factors related to readiness for action and attitudes towards obesity and preventive measures at baseline

The results from the correlation analysis are presented in **Appendix A.1**. The correlation coefficients (Pearson's r) ranged from -0.15 to 0.53, with only six coefficients being stronger than 0.4. The majority were between 0.00 and 0.20.

Multilevel analysis of intermediary effects and upon completion of the Alliance activities on reported readiness for action and attitudes towards obesity and preventive measures

All steps and results from the linear mixed models are presented in **Appendixes B1-B6**. From step 3, significant group differences were found for two factors in sub-sample 1, and a total of five factors and single items in sub-sample 2 (**Table 4-6**). From step 4, two significant interactions between group and time between baseline and follow-up response were found in sub-sample 1, while one was found in sub-sample 2. In sub-sample 1, Alliance members scored higher on the responsibility of "government / public policy" (b = 0.56, 95% CI= 0.11, 1.01), and higher on "social media" (b = 0.50, 95% CI = 0.08, 0.91) as a driver of behaviour, while the interaction between group and time between baseline and follow-up was significant for "advocacy outcome efficiency (b = -0.04, 95% CI= -0.07, -0.00) and "each individual" (b = -0.06, 95% CI = -0.12, -0.00). In sub-sample 2, Alliance members scored higher on "using social networking platforms to discuss a social issue" (b = 0.62, 95% CI = 0.21, 1.03), responsibility of "private business" (b = 0.50, 95% CI = 0.15, 0.85) and "transportation companies" (b = 0.42,

95% CI = 0.02, 0.82), and on “lack of knowledge / understanding” (b = 0.37, 95% CI = 0.06, 0.67)) and “lack of focus on healthy lifestyle among friends and family” (b = 0.44, 95% CI = 0.00, 0.87) as drivers of behaviour. A significant interaction between group and time between baseline and follow-up response was found for responsibility of “government / public policy” (b=-0.05, 95% CI=-0.09, -0.01).

Discussion

The main objective of CO-CREATE was “to reach diverse youth, to empower them and to combine their knowledge with that of researchers and stakeholders in the joint development of policy ideas for system directed overweight and obesity prevention” (7). To our knowledge, this is one of few studies assessing changes in adolescents` reported readiness for action and attitudes towards obesity and preventive measures (6). Based on the factor structure and single-items identified in Grewal et al (6), intermediary differences in sub-sample 1 between Youth Alliance members and the comparison group was identified for two factors, and a significant interaction between group and time in weeks between baseline and follow-up was found for two factors. Upon completion in sub-sample 2, group differences were identified for five factors and single items, and a significant interaction between group and time in weeks between baseline and follow-up for one factor.

Although we only identified intermediary effects on two factors, the group differences were in the expected direction. While both Alliance members and participants in the comparison group reported relatively high values on the responsibility of local, regional, and national governments to reduce the number of people that have overweight or obesity, Alliance members agreed more that obesity is a societal issue that need to be addressed by governments. Furthermore, Youth Alliance members agreed more that social media was a driver of behaviour. This represented a step away from internal drivers of obesity, and address that the wider environment, including the digital space, could influence unhealthy behaviours (5, 29).

However, for “advocacy outcome efficacy” we saw that group interacted with time between baseline and follow-up such that the score was reduced with increasing time for Alliance members, while no difference was observed in the comparison group. Alliance activities were aimed to influence participants conceptualization of obesity as a systemic issue. Thus, it may

be that the Alliances where successful in shifting the Alliance members thinking of obesity prevention towards a systemic perspective early on, while empowering them to believe they could make a difference needed more time. Another explanation may be ascribed to a relatively long Alliance period without any action, i.e., discussing the policy ideas with stakeholder. Thus, they may have become impatient, and this could have influenced their evaluation of the advocacy question.

Further support for a shift in Alliance members conceptualization of obesity towards a systemic perspective were seen for the responsibility of "each individual". Group interacted with time between baseline and follow-up response such that Alliance members reported lower individual responsibility than the comparison group with longer time between baseline and follow-up.

Effects upon completion showed that Alliance members were more comfortable with using "social networking platforms to discuss a social issue". As the Alliance members in this sample were the ones who continued to participate after the activities were moved to an online platform, it may be that they were already more comfortable with the use of social networking platforms, rather than an effect of the activities. Although this item did not fit within "ways of expressing political voice", social media is a platform for both civic and political expression (6). As adolescents are some of the most frequent users of social media (6), this may be an important aspect to improve to promote readiness to deal with societal issues, such as obesity.

Moreover, Alliance member scored higher than the comparison group on responsibility of "private business", and "transportation companies". These results were in line with CO-CREATEs assumptions of a shift in thinking of obesity as an issue of individual responsibility to one that requires systemic approaches. Moreover, public transport may be especially important for adolescents, as they are usually dependent on public transport to move around (30). Accordingly, the availability of public transport could be important to facilitate healthy choices, e.g., accessibility to healthy foods and opportunities for physical activity (31, 32). Additionally, Alliance members perceived "lack of focus on healthy lifestyle among friends and family" as a more important driver of behaviour than the comparison group. This also represented a step away from internal drivers of obesity, and address that it is influenced by the immediate context and the interplay with other people. However, the results related to

"lack of knowledge and understanding" as a driver of obesity, contrasts the systemic perspective to obesity prevention, and the expected results of the Alliances. We assumed that participating in the Youth Alliances would influence adolescents thinking of obesity, such that they would come to view knowledge about the association between lifestyle choices and obesity, and understanding of the health risk associated with obesity, as less important drivers.

Group interacted with time between baseline and follow up such that participants in the comparison group reported higher responsibility of local, regional, and national governments at the follow-up, while no effect of time was observed among Alliance members. Among adolescents in the comparison group, it may be that solely being subjected to the question on responsibility of government to prevent obesity at baseline, influenced their thinking of obesity. Additionally, baseline and follow-up responses were separated by the implementation of the COVID-19 lockdown policies. This may have led to an increasing perception of governmental responsibilities to act upon societal challenges among the comparison group, while Alliance members already perceived societal challenges as a strongly governmental responsibility.

In terms of readiness for action, only one factor showed a difference between Alliance members and the comparison group upon completion. As CO-CREATE recruited adolescents who were already interested to be engaged, it may be that they were already comfortable with voicing societal issues and participating in civic and political work. Moreover, group differences related to responsibility and drivers of behaviour covered important aspects to a "whole-of-society" approach to obesity prevention and suggest that the Alliances were at least partly successful in shifting the thinking of obesity towards a systemic perspective for some factors and single-items. However, while the estimate of significant group differences was relatively large for most factors, the 95% confidence intervals was quite wide. Thus, we cannot conclude that the results have any practical relevance.

Despite the Alliances attempt to recruit adolescents from diverse social background, the participants were mainly girls, and the majority was classified in the medium or high family affluence category. In terms of the demographic profile at baseline, sex and age were similar between Alliance members and participants in the comparison group, while mean values of family affluence was lower in the Alliances. This may be explained by the objective of CO-

CREATE to include diverse youth, and focus on giving a voice to disadvantaged groups, while in the general population, people from higher socioeconomic positions are more likely to engage in studies (33). However, we found no differences between the Alliance and comparison group for sub-samples 1 and 2. Hence, the lower mean family affluence for the comparison group in the sub-samples may be explained by the exclusion of a larger proportion of Norwegian adolescents in the comparison group than from the other countries.

The demographic profile of Youth Alliance members at baseline compared to upon completion were similar in terms of sex and mean age. Although the result was not significant, it seemed that the Alliances had retained a larger proportion of adolescents from medium affluent families than adolescents classified in the high family affluence category from baseline to upon completion. The proportion of low affluent adolescents were similar upon completion compared to baseline. As CO-CREATE recruited youth who were interested to be engaged in dealing with societal issues, high affluent participants might have already been engaged in other projects, and thus did not have time to follow the Alliances. Also, the potential benefits of a YPAR approach to policy design may be stronger for disadvantages groups (14, 34), e.g., adolescents with lower family affluence, and accordingly have increased their motivation to participate.

Strengths and limitations

The strengths of the present study included the recruitment of youth in 15 Alliances in five countries, and a comparison group. Moreover, we used a validated online questionnaire to assess changes in adolescents reported readiness for action and attitudes towards obesity and preventive measures. Web-based surveys has several benefits, such as shorter transmitting time, lower delivery cost and less data entry time, and it may be a more efficient way to reach adolescents (6). Furthermore, among participants who responded to the questionnaire, few had missing data. Moreover, CO-CREATE activities were built on PAR, and included a variety of approaches to empower the participants. In line with a YPAR approach, Alliance members contributed to adapt and implement these activities depending on Alliances preference and need, thus making it more relevant to the local context. Lastly, country variations were controlled for in the linear mixed models.

Some limitations should also be noted. A large proportion of the comparison group did only respond to the questionnaire once, and consequently had to be excluded from the analysis. A smaller number of Alliance members was also excluded due to responding to the questionnaire only once. Moreover, total responses at each measurement point varied, and we had to combine several measurement points to include a sufficient number of participants from the Alliances with both a completed baseline- and follow-up questionnaire in the analysis. Additionally, we aggregated results across 15 Alliances, and as the content and form of the activities and engagement varied between the Alliances, we cannot determine if the effects were due to the content or merely participating in the Alliances. Furthermore, generalizing the results to youth in all participating countries is problematic, as the majority at baseline was from either Norway or Poland, while the distribution was skewed towards a larger proportion of adolescents from Poland in sub-samples 1 and 2. Also, Youth Alliance members included in sub-samples 1 and 2 were not identical. Thus, the effects observed in sub-sample 1 and 2 may not only be attributed to immediate or later effects of the Alliance, but could also be due to different profiles of the participants. We were not able to assess response rate or selection bias, as we did not register information about adolescent who were invited but did not participate. Lastly, a rule of thumb in multilevel analysis suggests a minimum of ten clusters to obtain appropriate estimates (35), while we only had five. However, across both significant and non-significant group differences, the estimates were most often in the expected direction.

Conclusion

The present study used the CO-CREATE process evaluation questionnaire to explore adolescents' reported readiness for action and attitudes towards obesity and preventive measures, before, during and after participating in CO-CREATE Youth Alliance activities. We identified only a few group differences between the comparison group and Alliance members reported readiness for action and attitudes towards obesity and preventive measures, but those found were mostly in the expected direction. Thus, involving youth in activities based on participatory action research and policy design can promote a shift in adolescents' conceptualization of obesity in terms of individual or societal responsibility, and drivers of behaviours.

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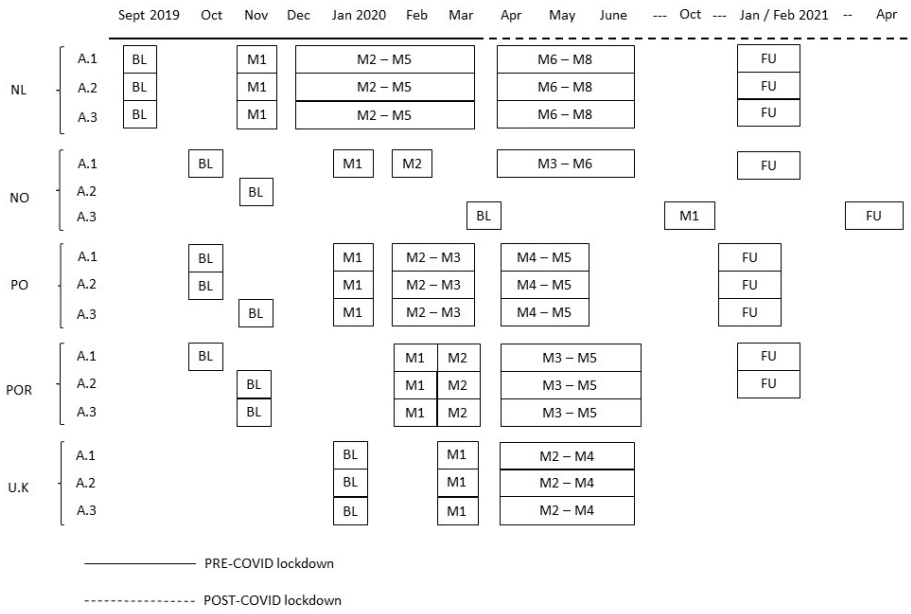

Figure 1. CO-CREATE Youth Alliances timeline of baseline (BL), measurement point (M1 – M8), and post-intervention follow-up (FU) responses to the CO-CREATE process evaluation questionnaires.

Table 1. Sex, age, family affluence, and number of participants from each country in the total and two sub-samples of European adolescents who responded to the CO-CREATE process evaluation baseline questionnaire (n=439)

	Total sample (n=439[a])			Sub sample 1 (n= 213[a])		Sub-sample 2 (n= 195[a])	
	Comparison (n=280)	Alliance (n=159)	Total	Comparison (n=123)	Alliance (n=90)	Comparison (n=123)	Alliance (n=72)
Sex, % (n)							
Male	30 (84)	23 (37)	27 (121)	21 (26)	23 (21)	21 (26)	22 (16)
Female	69 (193)	76 (121)	72 (314)	77 (94)	77 (69)	77 (94)	76 (55)
Prefer not to say	1 (3)	-	1 (3)	2 (3)	-	2 (3)	-
Age, M (SD)	17.1 (1.0)	17.1 (1.0)	17.1 (1.0)	16.8 (0.9)	17.0 (0.9)	16.8 (0.9)	17.0 (1.0)
Family affluence[b], % (n)							
Low	8 (23)	16 (26)	11 (49)	12 (15)	18 (16)	12 (15)	15 (11)
Medium	34 (96)	42 (66)	37 (162)	45 (55)	39 (35)	45 (55)	51 (37)
High	56 (157)	41 (65)	50 (221)	41 (50)	43 (39)	41 (50)	32 (23)
Country, % (n)							
The Netherlands	6 (18)	23 (36)	12 (54)	-	18 (16)	-	31 (22)
Norway	55 (154)	18 (29)	42 (183)	32 (39)	7 (6)	32 (39)	12 (9)
Poland	30 (83)	37 (58)	32 (141)	63 (78)	53 (48)	63 (78)	32 (23)
Portugal	9 (25)	13 (21)	11 (46)	5 (6)	17 (15)	5 (6)	22 (16
The U. K	-	9 (15)	3 (15)	-	5 (5)	-	3 (2)

[a] Varied slightly for the different variables; [b] Family affluence calculated by the formation of a composite score based on responses to FAS survey questions, graded on a scale from 0-13: Low < 6, Medium: 7-9, High > 9; Age at the time of baseline response; Sub-sample 1 include all participants who responded to the baseline questionnaire and completed the questionnaire at a measurement point prior to the COVID-19 lockdown; Sub-sample 2 include all participants who responded to the baseline questionnaire and either the last measurement point or the post-intervention follow-up.

Table 2. Proportions of sex and low, medium and high categories of family affluence among Alliance members who responded to the CO-CRATE process evaluation questionnaire at baseline or upon completion of the Alliance activities

	Alliance members at baseline (n=159[a])	Alliance members upon completion (n=72[a])	p
Sex, % (n)			1
Male	23 (37)	22 (16)	
Female	76 (121)	76 (55)	
Family affluence[b], % (n)			0.34
Low	16 (26)	15 (11)	
Medium	42 (66)	51 (37)	
High	41 (65)	32 (23)	

[a] Varied slightly for the different variables; [b]Family affluence calculated by the formation of a composite score based on responses to FAS survey questions, graded on a scale from 0-13: Low < 6, Medium: 7-9, High > 9; Chi-squared test was used to compare proportions of sex and family affluence.

Table 3. Comparison of the mean values of sex, age, family affluence, and factors within the readiness for action- and drivers of behaviour concepts between Alliance members and comparison group from a sample of European adolescents who responded to the CO-CREATE process evaluation baseline questionnaire (n=439)

	Total sample (n=439[a])				Sub-sample 1 (n=213[a])				Sub-sample2 (n=195[a])			
	Comparison	Alliance	p	d[d]	Comparison	Alliance	p	d[d]	Comparison	Alliance	p	d[d]
Sex	1.7 (0.5)	1.77 (0.4)	0.12	-0.15 (-0.35, 0.04)	1.8 (0.4)	1.8 (0.4)	0.78	0.04 (-0.23, 0.31)	1.8 (0.4)	1.8 (0.4)	0.90	-0.27 (-0.27, 0.31)
Age	17.1 (1.0)	17.1 (1.0)	0.93	0.01 (-0.19, 0.2)	16.8 (0.9)	17.0 (0.9)	0.14	-0.2 (-0.48, 0.07)	16.8 (0.9)	17.0 (1.0)	0.11	-0.53 (-0.53, 0.05)
Family affluence[b]	9.6 (2.0)	8.8 (2.2)	<0.001	0.38 (0.18, 0.57)	9.0 (2.1)	8.7 (2.4)	0.37	0.12 (-0.15, 0.4)	9.0 (2.1)	8.5 (2.1)	0.08	-0.03 (-0.03, 0.56)
Readiness for action												
Ways of expressing political voice	3.03 (0.90)	3.49 (0.85)	**<0.001**	-0.53 (-0.73, -0.33)	2.94 (0.95)	3.43 (0.79)	**<0.001**	-0.55 (-0.82, -0.27)	2.94 (0.95)	3.47 (0.82)	**<0.001**	-0.88 (-0.88, -0.29)
Competence for civic action	3.26 (0.92)	3.82 (0.79)	**<0.001**	-0.64 (-0.84, -0.44)	3.51 (0.84)	3.76 (0.80)	**0.03**	-0.31 (-0.59, -0.04)	3.51 (0.84)	3.70 (0.88)	0.20	-0.52 (-0.52, 0.06)
Advocacy outcome efficacy	3.09 (0.75)	3.36 (0.72)	**<0.001**	-0.37 (-0.56, -0.17)	3.19 (0.71)	3.36 (0.62)	0.07	-0.25 (-0.52, 0.02)	3.19 (0.71)	3.35 (0.69)	0.08	-0.52 (-0.52, 0.07)
Knowledge of resources	3.83 (0.78)	3.73 (0.76)	0.22	0.12 (-0.07, 0.32)	3.80 (0.78)	3.76 (0.74)	0.94	0.05 (-0.22, 0.32)	3.80 (0.78)	3.69 (0.75)	0.59	-0.14 (-0.14, 0.44)
Using social networking platforms to discuss a social issue[c]	3.00 (1.22)	3.42 (1.16)	**<0.001**	-0.36 (-0.55, -0.16)	3.02 (1.15)	3.18 (1.10)	0.76	-0.14 (-0.41, 0.14)	3.02 (1.15)	3.20 (1.19)	0.65	-0.44 (-0.44, 0.14)
Responsibility												
Local environment	4.04 (0.62)	4.09 (0.66)	0.42	-0.08 (-0.27, 0.12)	3.92 (0.61)	3.99 (0.56)	0.30	-0.13 (-0.4, 0.14)	3.92 (0.61)	3.94 (0.72)	0.71	-0.32 (-0.32, 0.26)
Private business	2.79 (0.83)	3.05 (0.93)	**0.003**	-0.3 (-0.5, -0.11)	2.81 (0.83)	2.97 (0.83)	0.16	-0.19 (-0.46, 0.08)	2.81 (0.83)	2.77 (0.90)	0.57	-0.25 (-0.25, 0.34)
Food and drink industry / business	3.39 (0.95)	3.39 (1.13)	0.95	0.01 (-0.19, 0.2)	3.22 (0.92)	3.28 (1.06)	0.76	-0.05 (-0.33, 0.22)	3.22 (0.92)	3.22 (1.18)	0.92	-0.28 (-0.28, 0.3)
Government / public policy	3.42 (0.98)	3.67 (1.02)	**0.01**	-0.25 (-0.44, -0.05)	3.25 (0.98)	3.54 (0.99)	**0.047**	-0.3 (-0.57, -0.02)	3.25 (0.98)	3.43 (1.04)	0.26	-0.48 (-0.48, 0.11)
Each individual[c]	4.18 (0.87)	4.05 (0.97)	0.16	0.14 (-0.06, 0.34)	4.28 (0.74)	4.01 (0.98)	**0.03**	0.31 (0.04, 0.59)	4.28 (0.74)	3.96 (1.10)	**0.02**	0.06 (0.06, 0.65)
Schools[c]	3.65 (1.00)	3.86 (1.05)	**0.04**	-0.21 (-0.4, -0.01)	3.51 (1.01)	3.71 (1.05)	0.15	-0.19 (-0.46, 0.08)	3.51 (1.01)	3.61 (1.07)	0.55	-0.39 (-0.39, 0.2)
Companies that help people diet[c]	3.66 (0.96)	3.97 (0.95)	**0.001**	-0.32 (-0.52, -0.13)	3.64 (0.97)	3.93 (0.93)	**0.03**	-0.31 (-0.58, -0.03)	3.64 (0.97)	3.86 (0.91)	0.16	-0.52 (-0.52, 0.06)
Transportation companies[c]	2.58 (1.00)	2.71 (1.14)	0.20	-0.13 (-0.32, 0.07)	2.60 (0.96)	2.63 (1.04)	0.73	-0.03 (-0.3, 0.25)	2.60 (0.96)	2.66 (1.09)	0.84	-0.35 (-0.35, 0.23)

Town and city planners[c]	3.29 (1.12)	3.48 (1.16)	0.09	-0.17 (-0.37, 0.02)	3.34 (1.07)	3.53 (1.14)	0.24	-0.2 (-0.47, 0.08)	3.34 (1.07)	3.40 (1.29)	0.85	-0.35 (-0.35, 0.24)
Drivers of behaviour												
Access to unhealthy food	4.20 (0.73)	4.25 (0.76)	0.50	-0.07 (-0.26, 0.13)	4.19 (0.74)	4.31 (0.67)	0.25	-0.17 (-0.44, 0.1)	4.19 (0.74)	4.16 (0.76)	0.99	-0.25 (-0.25, 0.33)
Barriers to healthy food and physical activity opportunities	3.50 (0.92)	3.72 (0.94)	**0.02**	-0.23 (-0.43, -0.04)	3.55 (0.88)	3.70 (0.90)	0.38	-0.16 (-0.44, 0.11)	3.55 (0.88)	3.70 (0.88)	0.27	-0.46 (-0.46, 0.12)
Social media	2.85 (0.91)	3.41 (0.88)	**<0.001**	-0.62 (-0.82, -0.42)	2.95 (0.96)	3.52 (0.84)	**<0.001**	-0.62 (-0.9, -0.34)	2.95 (0.96)	3.32 (0.86)	**0.02**	-0.7 (-0.7, -0.11)
Lack of knowledge and understanding	3.72 (0.86)	3.84 (1.02)	0.18	-0.13 (-0.33, 0.06)	3.74 (0.85)	3.83 (1.04)	0.59	-0.1 (-0.38, 0.17)	3.74 (0.85)	3.65 (1.08)	0.44	-0.21 (-0.21, 0.38)
Motivation and coping	4.13 (0.64)	4.21 (0.72)	0.24	-0.12 (-0.31, 0.08)	4.21 (0.59)	4.31 (0.64)	0.20	-0.17 (-0.44, 0.1)	4.21 (0.59)	4.19 (0.73)	0.82	-0.27 (-0.27, 0.32)
Increased use of motorized transportation[c]	3.49 (1.02)	3.68 (1.14)	0.07	-0.18 (-0.38, 0.02)	3.59 (0.98)	3.78 (1.10)	0.23	-0.18 (-0.45, 0.09)	3.59 (0.98)	3.66 (1.17)	0.88	-0.36 (-0.36, 0.22)
Biological factors[c]	3.58 (1.00)	3.73 (0.97)	0.11	-0.16 (-0.36, 0.03)	3.63 (0.99)	3.80 (0.95)	0.33	-0.18 (-0.45, 0.09)	3.63 (0.99)	3.55 (1.07)	0.47	-0.22 (-0.22, 0.37)
Lack of time to lead a healthy life[c]	3.58 (1.24)	3.69 (1.22)	0.38	-0.09 (-0.28, 0.11)	3.79 (1.17)	3.72 (1.25)	0.83	0.06 (-0.22, 0.33)	3.79 (1.17)	3.53 (1.16)	0.09	-0.07 (-0.07, 0.52)
Lack of policies preventing overweight and obesity[c]	3.27 (0.94)	3.68 (0.96)	**<0.001**	-0.43 (-0.62, -0.23)	3.32 (0.91)	3.57 (1.01)	**0.03**	-0.26 (-0.53, 0.01)	3.32 (0.91)	3.55 (1.04)	0.13	-0.53 (-0.53, 0.05)
Lack of focus on healthy lifestyle among friends and family[c]	3.68 (0.99)	3.77 (0.93)	0.33	-0.1 (-0.29, 0.1)	3.65 (1.04)	3.69 (0.93)	0.93	-0.04 (-0.31, 0.23)	3.65 (1.04)	3.66 (0.93)	0.93	-0.3 (-0.3, 0.28)

[a] Varied slightly for the different variables; [b]Family affluence calculated by the formation of a composite score based on responses to FAS survey questions, graded on a scale from 0-13; [c] Single-item; [d] Independent t-tests was used to compare mean values; [d] d = Cohen's d with 95% confidence interval, calculated from the mean differences (mean value of the comparsion group substracted by the mean value of the Alliance members) divided by the pooled SD; Age at the time of baseline response; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Total sample include all participants who responded to the baseline questionnaire; Sub-sample 1 include all participants who responded to the baseline questionnaire and completed the questionnaire at a measurement point prior to the COVID-19 lockdown; Sub-sample 2 include all participants who responded to the baseline questionnaire and either the last measurement point or the post-intervention follow-up.

Table 4. Difference between the comparison group and Alliance on four factors and a single item measuring readiness for action in a sample of European adolescents participating in CO-CREATE Youth Alliances

Factor		Sub-sample 1 (n = 213[a])				Sub-sample 2 (n = 195[a])			
		Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Ways of expressing political voice	Group	0.21	-0.10, 0.52	0.17	0.03	0.14	-0.14, 0.43	0.32	0.07
	Baseline	0.63	0.54, 0.73	<0.001		0.66	0.55, 0.77	<0.001	
Competence for civic action	Group	0.13	-0.18, 0.44	0.40	0.13	0.22	-0.05, 0.49	0.11	0.05
	Baseline	0.62	0.52, 0.72	<0.001		0.59	0.48, 0.70	<0.001	
Advocacy outcome efficacy	Group	-0.05	-0.28, 0.18	0.67	0.00	0.19	-0.08, 0.46	0.16	0.00
	Baseline	0.63	0.51, 0.75	<0.001		0.44	0.30, 0.58	<0.001	
Knowledge of resources	Group	-0.11	-0.34, 0.13	0.39	0.00	0.20	-0.10, 0.50	0.19	0.10
	Baseline	0.60	0.49, 0.70	<0.001		0.41	0.27, 0.54	<0.001	
Using social networking platforms to discuss a social issue[b]	Group	0.33	-0.08, 0.74	0.11	0.00	0.62	0.21, 1.03	**0.003**	0.03
	Baseline	0.47	0.35, 0.60	<0.001		0.55	0.42, 0.67	<0.001	

[a] Varied slightly for the different factors; [b] Single-item; Step 3 in the multi-level model with country at the upper-level; Adjusted for baseline score, time between baseline and measurement point- or follow-up response, sex, age, and family affluence; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from linear mixed models; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score; Sub-sample 1 include all participants who responded to the baseline questionnaire and completed the questionnaire at a measurement point prior to the COVID-19 lockdown; Sub-sample 2 include all participants who responded to the baseline questionnaire and either the last measurement point or the post-intervention follow-up.

Table 5. Differences between the comparison group and Alliance members on four factors and five single items measuring responsibility in a sample of European adolescents participating in CO-CREATE Youth Alliances

		Sub-sample 1 (n = 213[a])				Sub-sample 2 (n = 195[a])			
Factor		Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Local environment	Group	0.05	-0.24, 0.34	0.72	0.19	0.14	-0.11, 0.39	0.28	0.16
	Baseline	0.42	0.28, 0.55	<0.001		0.40	0.26, 0.54	<0.001	
Private business	Group	-0.00	-0.43, 0.43	1	0.03	0.50	0.15, 0.85	**0.01**	0.11
	Baseline	0.38	0.24, 0.51	<0.001		0.31	0.17, 0.45	<0.001	
Food and drink industry / business	Group	0.38	-0.07, 0.82	0.10	0.08	0.20	-0.17, 0.56	0.30	0.05
	Baseline	0.40	0.27, 0.53	<0.001		0.43	0.43	<0.001	
Government / public policy	Group	0.56	0.11, 1.01	**0.02**	0.03	0.23	-0.14, 0.61	0.22	0.05
	Baseline	0.26	0.13, 0.39	<0.001		0.27	0.12, 0.41	<0.001	
Each individual[b]	Group	-0.12	-0.47, 0.22	0.48	0.00	0.20	-0.16, 0.56	0.26	0.20
	Baseline	0.29	0.16, 0.43	<0.001		0.40	0.26, 0.54	<0.001	
Schools[b]	Group	0.39	-0.02, 0.79	0.06	0.00	0.37	-0.01, 0.75	0.05	0.00
	Baseline	0.32	0.18, 0.45	<0.001		0.33	0.20, 0.47	<0.001	
Companies that help people diet[b]	Group	-0.07	-0.51, 0.36	0.74	0.08	-0.15	-0.53, 0.23	0.44	0.01
	Baseline	0.34	0.21, 0.47	<0.001		0.34	0.19, 0.49	<0.001	
Transportation companies[b]	Group	0.22	-0.26, 0.70	0.36	0.25	0.42	0.02, 0.82	**0.04**	0.00
	Baseline	0.18	0.06, 0.30	0.005		0.20	0.06, 0.34	0.01	
Town and city planners[b]	Group	-0.05	-0.56, 0.47	0.86	0.09	0.19	-0.21, 0.59	0.36	0.00
	Baseline	0.28	0.16, 0.41	<0.001		0.33	0.21, 0.46	<0.001	

[a] Varied slightly for the different factors; [b] Single-item; Step 3 in the multi-level model with country at the upper-level; Adjusted for baseline score, time between baseline and measurement point- or follow-up response, sex, age, and family affluence; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and Intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from linear mixed models; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score; Sub-sample 1 include all participants who responded to the baseline questionnaire and completed the questionnaire at a measurement point prior to the COVID-19 lockdown; Sub-sample 2 include all participants who responded to the baseline questionnaire and either the last measurement point or the post-intervention follow-up.

Table 6. Differences between the comparison group and Alliance members on five factors and five single items measuring drivers of behaviour in a sample of European adolescents participating in CO-CREATE Youth Alliances

		Sub-sample 1 (n = 213[a])				Sub-sample 2 (n=195[a])			
Factor		Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Access to unhealthy food	Group	0.06	-0.27, 0.39	0.73	0.24	0.13	-0.16, 0.43	0.38	0.16
	Baseline	0.50	0.37, 0.62	<0.001		0.35	0.21, 0.49	<0.001	
Barriers to healthy food and physical activity opportunities	Group	0.18	-0.23, 0.59	0.38	0.09	0.25	-0.10, 0.61	0.16	0.10
	Baseline	0.52	0.39, 0.64	<0.001		0.47	0.33, 0.61	<0.001	
Social media	Group	0.50	0.08, 0.91	**0.02**	0.04	0.27	-0.09, 0.62	0.14	0.00
	Baseline	0.37	0.24, 0.50	<0.001		0.42	0.28, 0.55	<0.001	
Lack of knowledge and understanding	Group	0.02	-0.41, 0.45	0.92	0.00	0.37	0.06, 0.67	**0.02**	0.02
	Baseline	0.53	0.42, 0.65	<0.001		0.50	0.38, 0.61	<0.001	
Motivation and coping	Group	-0.09	-0.40, 0.22	0.55	0.20	-0.07	-0.36, 0.22	0.64	0.20
	Baseline	0.56	0.42, 0.70	<0.001		0.40	0.24, 0.55	<0.001	
Increased use of motorized transportation[b]	Group	0.16	-0.35, 0.67	0.54	0.11	0.33	-0.09, 0.75	0.12	0.00
	Baseline	0.35	0.21, 0.48	<0.001		0.24	0.09, 0.38	0.001	
Biological factors[b]	Group	-0.09	-0.44, 0.27	0.64	0.00	0.02	-0.38, 0.41	0.92	0.04
	Baseline	0.35	0.23, 0.48	<0.001		0.27	0.14, 0.41	<0.001	
Lack of time to lead a healthy life[b]	Group	0.39	-0.11, 0.90	0.11	0.01	0.06	-0.35, 0.47	0.78	0.08
	Baseline	0.52	0.41, 0.63	<0.001		0.49	0.37, 0.61	<0.001	
Lack of policies preventing overweight and obesity[b]	Group	0.08	-0.38, 0.53	0.74	0.12	-0.01	-0.38, 0.36	0.94	0.00
	Baseline	0.40	0.26, 0.53	0.001		0.44	0.30, 0.58	<0.001	
Lack of focus on healthy lifestyle among friends and family[b]	Group	0.35	-0.15, 0.86	0.17	0.06	0.44	0.00, 0.87	**0.048**	0.07
	Baseline	0.33	0.19, 0.47	<0.001		0.30	0.15, 0.45	<0.001	

[a] Varied slightly for the different factors; [b]Single-item; Step 3 in the multi-level model with country at the upper-level; Adjusted for baseline score, time between baseline and measurement point- or follow-up response, sex, age, and family affluence; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from linear mixed models; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score; Sub-sample 1 include all participants who responded to the baseline questionnaire and at a measurement point prior to the COVID-19 lockdown; Sub-sample 2 include all participants who responded to the baseline questionnaire and either the last measurement point or the post-intervention follow-up.

Appendixes

A.1 Correlations between age, family affluence, and factors within readiness for action, and attitudes towards obesity and preventive measures in a sample of European adolescents at baseline (n=439)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1: Age	1.00	0.06	-0.05	-0.07	0.00	0.09	-0.10	0.09	0.11[a]	0.08	0.15[b]	0.10[a]	0.11[a]	-0.01	-0.03	0.12[a]	0.09	0.07	0.06	0.01	0.07	0.04	0.02	0.00	0.16[b]	0.05
2: Family affluence scale		1.00	-0.06	-0.12	-0.09	0.04	-0.10	0.11[a]	0.00	0.13[b]	0.06	0.12[a]	-0.02	-0.11	-0.05	-0.03	-0.01	-0.10	-0.15	0.03	-0.02	-0.02	0.08	0.02	-0.07	-0.03
3: Ways of expressing political voice			1.00	0.46[b]	0.32[b]	0.12[b]	0.30[b]	0.16[b]	0.16[b]	0.21[b]	0.14[b]	0.04	0.17[b]	0.07	0.12[a]	0.16[b]	0.07	0.18[b]	0.08	0.08	0.05	0.08	0.14[b]	0.06	0.20[b]	0.06
4: Competence for civic action				1.00	0.38[b]	0.15[b]	0.31[b]	0.19[b]	0.14[b]	0.17[b]	0.16[b]	0.14[b]	0.12[a]	0.07	0.04	0.20[b]	0.19[b]	0.17[b]	0.20[b]	0.14[b]	0.19[b]	0.15[b]	0.11[a]	0.16[b]	0.26[b]	0.14[b]
5: Advocacy outcome efficacy					1.00	0.21[b]	0.20[b]	0.11[a]	0.13[b]	0.02	0.07	0.09	0.15[b]	0.03	0.04	0.04	0.07	0.05	0.12[a]	0.01	0.01	0.00	0.10[a]	0.06	0.11[a]	0.05
6: Knowledge of resources						1.00	0.03	0.16[b]	0.09	0.04	0.03	0.17[b]	0.09	0.10[a]	0.02	0.07	0.09	0.00	0.06	0.10[a]	0.11[a]	0.01	-0.04	0.00	-0.03	0.09
7: Using social networking platforms to discuss a social issue							1.00	0.13[b]	0.08	0.05	0.05	-0.03	0.02	0.10[a]	0.07	0.07	0.04	0.07	0.09	0.17[b]	-0.01	0.10[a]	0.01	0.01	0.20[b]	0.08
8: Local environment								1.00	0.32[b]	0.35[b]	0.45[b]	0.32[b]	0.52[b]	0.34[b]	0.16[b]	0.24[b]	0.30[b]	0.27[b]	0.13[b]	0.21[b]	0.20[b]	.131[b]	0.08	0.14[b]	0.22[b]	0.21[b]
9: Private business									1.00	0.29[b]	0.28[b]	0.05	0.32[b]	0.21[b]	0.32[b]	0.36[b]	0.07	0.20[b]	0.32[b]	0.06	0.10[a]	0.23[b]	0.15[b]	0.07	0.24[b]	0.11[a]
10: Food and drink industry / business										1.00	0.53[b]	0.16[b]	0.26[b]	0.11[*]	0.40[b]	0.35[b]	0.20[b]	0.21[b]	0.12[a]	0.13[b]	0.15[b]	0.18[b]	0.13[b]	-0.01	0.13[b]	0.16[b]
11: Government / public policy											1.00	0.21[b]	0.40[b]	0.21[b]	0.31[b]	0.41[b]	0.23[b]	0.18[b]	0.15[b]	0.10[a]	0.14[b]	0.21[b]	0.10[a]	0.02	0.23[b]	0.20[b]
12:Each individual												1.00	0.22[b]	0.08	0.05	0.19[b]	0.23[b]	0.07	0.00	0.10[a]	0.21[a]	0.02	0.04	0.10[a]	0.03	0.10[a]
13: Schools													1.00	0.16[b]	0.21[b]	0.25[b]	0.19[b]	0.18[b]	0.17[b]	0.12[a]	0.16[a]	0.11[a]	0.10[a]	0.10[a]	0.24[b]	0.13[b]
14: Companies that help people diet														1.00	0.09	0.15[b]	0.08	0.13[b]	0.17[b]	0.11[a]	0.11[a]	0.12[a]	0.11[a]	0.02	0.10[a]	0.05
15: Transportation companies															1.00	0.37[b]	0.07	0.09	0.15[b]	0.07	0.06	0.28[b]	0.05	-0.01	0.16[b]	0.00
16: Town and city planners																1.00	0.24[b]	0.20[b]	0.23[b]	0.21[b]	0.20[b]	0.27[b]	0.12[a]	0.05	0.25[b]	0.16[b]
17: Access to unhealthy food																	1.00	0.37[b]	0.23[b]	0.22[b]	0.31[b]	0.31[b]	0.07	0.22[b]	0.36[b]	0.29[b]
18: Barriers to healthy food and physical activity opportunities																		1.00	0.23[b]	0.19[b]	0.26[b]	0.18[b]	0.22[b]	0.32[b]	0.30[b]	0.31[b]
19: Social media																			1.00	0.21[b]	0.23[b]	0.31[b]	0.12[a]	0.13[b]	0.26[b]	0.24[b]
20: Lack of knowledge and understanding																				1.00	0.29[b]	0.22[b]	0.15[b]	0.03	0.33[b]	0.15[b]
21: Motivation and coping																					1.00	0.29[b]	0.26[b]	0.32[b]	0.26[b]	0.26[b]

22: Increased use of motorized transportation	1.00	0.14[b]	0.10[a]	0.15[b]	0.18[b]
23: Biological factors		1.00	0.20[b]	0.10[a]	0.14[b]
24: Lack of time to lead a healthy life			1.00	0.22[b]	0.13[b]
25: Lack of policies preventing overweight and obesity				1.00	0.16[b]
26: Lack of focus on healthy lifestyle among friends and family					1.00

[a] Correlation is significant at the 0.05 level (2-tailed); [b] Correlation is significant at the 0.01 level (2-tailed); Correlation coefficients are pearson's r;

Appendix B.1. Difference between the comparison group and Alliance on four factors and a single item measuring readiness for action in a sample of European adolescents who responded to the CO-CREATE process evaluation questionnaire at baseline and at a measurement point prior to the COVID-19 lockdown policies (n=213[a])

		Step 1	Step 2				Step 3				Step 4			
		ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Ways of expressing political voice	Group	0.21	0.48	0.23, 0.72	<0.001	0.14	0.21	-0.10, 0.52	0.17	0.03	0.65	0.00, 1.30	0.05	0.36
	Baseline						0.63	0.54, 0.73	<0.001		0.64	0.54, 0.73	<0.001	
	Time						0.00	-0.03, 0.03	0.89		0.01	-0.05, 0.07	0.39	
	Sex						-0.06	-0.26, 0.15	0.59		-0.06	-0.27, 0.14	0.53	
	Age						0.02	-0.07, 0.11	0.66		0.01	-0.08, 0.1	0.75	
	FAS						-0.01	-0.05, 0.03	0.50		-0.02	-0.06, 0.02	0.40	
	Group x time										-0.03	-0.07, 0.01	0.12	
Competence for civic action	Group	0.07	0.47	0.23, 0.70	<0.001	0.17	0.13	-0.18, 0.44	0.40	0.13	0.45	-0.21, 1.11	0.18	0.36
	Baseline						0.62	0.52, 0.72	<0.001		0.61	0.51, 0.71	<0.001	
	Time						-0.01	-0.04, 0.01	0.36		0.00	-0.03, 0.03	0.92	
	Sex						0.15	-0.06, 0.36	0.15		0.15	-0.05, 0.36	0.15	
	Age						0.09	0.00 0.18	0.04		0.10	0.01, 0.18	0.04	
	FAS						-0.03	-0.07, 0.01	0.12		-0.03	-0.07, 0.01	0.10	
	Group x time										-0.02	-0.07, 0.02	0.27	
Advocacy outcome efficacy	Group	0.06	0.15	-0.05, 0.36	0.14	0.06	-0.05	-0.28, 0.18	0.67	0.00	0.44	-0.1, 0.98	0.11	0.31
	Baseline						0.63	0.51, 0.75	<0.001		0.64	0.52, 0.75	<0.001	
	Time						-0.01	-0.03, 0.01	0.21		0.00	-0.02, 0.02	0.97	
	Sex						-0.03	-0.22, 0.16	0.76		-0.02	-0.2, 0.17	0.86	
	Age						0.04	-0.04, 0.12	0.34		0.03	-0.05, 0.11	0.48	
	FAS						-0.03	-0.07, 0.01	0.11		-0.04	-0.07, 0.00	0.06	
	Group x time										-0.04	-0.07, 0.00	0.048	
Knowledge of resources	Group	0.00	-0.11	-0.31, 0.09	0.29	0.00	-0.11	-0.34, 0.13	0.39	0.00	0.08	-0.48, 0.64	0.78	0.33
	Baseline						0.60	0.49, 0.70	<0.001		0.60	0.49, 0.70	<0.001	
	Time						0.00	-0.02, 0.02	0.93		0.00	-0.02, 0.03	0.64	
	Sex						-0.06	-0.25, 0.14	0.56		-0.05	-0.24, 0.14	0.60	
	Age						0.06	-0.02, 0.15	0.14		0.06	-0.03, 0.15	0.17	
	FAS						-0.03	-0.07, 0.01	0.11		-0.03	-0.07, 0.01	0.10	
	Group x time										-0.01	-0.05, 0.02	0.47	
Using social networking platforms to discuss a social issue[b]	Group	0.00	0.27	-0.05, 0.59	0.10	0.00	0.33	-0.08, 0.74	0.11	0.00	0.79	-0.17, 1.75	0.10	0.97
	Baseline						0.47	0.35, 0.60	<0.001		0.48	0.36, 0.61	<0.001	
	Time						0.01	-0.02, 0.04	0.55		0.02	-0.02, 0.06	0.28	
	Sex						-0.25	-0.58, 0.08	0.14		-0.24	-0.57, 0.09	0.15	
	Age						-0.27	-0.42, -0.12	<0.001		-0.28	-0.42, -0.13	<0.001	
	FAS						-0.06	-0.13, 0.00	0.05		-0.07	-0.13, 0.00	0.04	
	Group x time										-0.04	-0.10, 0.03	0.29	

[a] Varied slightly for the different factors; [b] Single-item; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from four steps in a linear mixed model with country at the upper-level; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score.

Appendix B.2. Difference between the comparison group and Alliance on four factors and five singles item measuring responsibility in a sample of European adolescents who responded to the CO-CREATE process evaluation questionnaire at baseline and at a measurement point prior to the COVID-19 lockdown policies (n=213[a])

		Step 1	Step 2				Step 3				Step 4			
		ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Local environment	Group Baseline Time Sex Age FAS Group x time	0.12	0.14	-0.05, 0.32	0.15	0.18	0.05 0.42 0.00 0.13 0.00 0.02	-0.24, 0.35 0.28, 0.55 -0.03, 0.02 -0.07, 0.32 -0.09, 0.08 -0.02, 0.05	0.72 <0.001 0.75 0.21 0.93 0.42	0.19	0.25 0.41 0.00 0.12 0.00 0.01 -0.01	-0.38, 0.88 0.28, 0.55 -0.03, 0.03 -0.07, 0.32 -0.09, 0.08 -0.02, 0.05 -0.05, 0.03	0.43 <0.001 0.86 0.22 0.95 0.46 0.47	0.35
Private business	Group Baseline Time Sex Age FAS Group x time	0.00	0.19	-0.05, 0.43	0.12	0.00	-0.00 0.38 -0.01 0.16 0.10 0.00	-0.43, 0.43 0.24, 0.51 -0.05, 0.03 -0.12, 0.45 -0.03, 0.22 -0.05, 0.05	1.00 <0.001 0.51 0.26 0.13 1.00	0.03	0.61 0.38 0.01 0.15 0.09 0.00 -0.04	-0.31, 1.53 0.25, 0.52 -0.13, 0.14 -0.13, 0.43 -0.03, 0.22 -0.06, 0.05 -0.10, 0.01	0.17 <0.001 0.76 0.29 0.15 0.89 0.13	0.69
Food and drink industry / business	Group Baseline Time Sex Age FAS Group x time	0.22	0.39	0.11, 0.67	0.01	0.21	0.38 0.40 0.01 -0.01 -0.03 0.02	-0.07, 0.83 0.27, 0.53 -0.03, 0.04 -0.32, 0.29 -0.16, 0.10 -0.04, 0.07	0.10 <0.001 0.70 0.94 0.66 0.56	0.08	0.57 0.40 0.01 -0.01 -0.03 0.01 -0.01	-0.41, 1.54 0.27, 0.53 -0.03, 0.06 -0.32, 0.29 -0.16, 0.10 -0.04, 0.07 -0.08, 0.05	0.25 <0.001 0.57 0.93 0.65 0.61 0.67	0.79
Government / public policy	Group Baseline Time Sex Age FAS Group x time	0.09	0.43	0.15, 0.70	<0.001	0.11	0.56 0.26 0.03 0.15 0.01 -0.01	0.11, 1.01 0.13, 0.39 -0.01, 0.07 -0.15, 0.46 -0.12, 0.14 -0.06, 0.05	0.02 <0.001 0.10 0.32 0.90 0.84	0.03	0.95 0.26 0.04 0.14 0.01 -0.01 -0.03	-0.03, 1.92 0.12, 0.39 -0.02, 0.11 -0.16, 0.44 -0.12, 0.14 -0.07, 0.05 -0.09, 0.03	0.06 <0.001 0.12 0.36 0.91 0.79 0.39	0.77
Each individual[b]	Group Baseline Time Sex Age FAS Group x time	0.09	-0.12	-0.37, 0.14	0.36	0.08	-0.12 0.29 0.00 -0.07 0.16 -0.01	-0.47, 0.22 0.16, 0.43 -0.02, 0.03 -0.35, 0.21 0.04, 0.28 -0.07, 0.04	0.48 <0.001 0.97 0.61 0.01 0.64	0.00	0.67 0.29 0.02 -0.05 0.14 -0.02 -0.06	-0.13, 1.48 0.15, 0.42 -0.01. 0.05 -0.33. 0.22 0.02. 0.27 -0.08. 0.03 -0.12. 0.00	0.10 <0.001 0.23 0.71 0.02 0.44 0.03	0.68
Schools[b]	Group	0.02	0.41	0.12, 0.7	0.01	0.02	0.39	-0.02, 0.79	0.06	0.00	0.12	-0.81, 1.06	0.80	0.92

	Baseline Time Sex Age FAS Group x time						0.32 0.01 -0.01 0.06 0.01	0.18, 0.45 -0.02, 0.04 -0.33, 0.31 -0.08, 0.21 -0.05, 0.07	<0.001 0.60 0.96 0.40 0.73		0.31 0.00 -0.01 0.07 0.01 0.02	0.18, 0.45 -0.03, 0.04 -0.34, 0.31 -0.08, 0.21 -0.05, 0.08 -0.04, 0.08	<0.001 0.91 0.93 0.37 0.66 0.54	
Companies that help people diet[b]	Group Baseline Time Sex Age FAS Group x time	0.08	0.13	-0.14, 0.40	0.34	0.11	-0.07 0.34 0.00 0.33 0.09 -0.01	-0.51, 0.36 0.21, 0.47 -0.04, 0.03 0.03, 0.63 -0.04, 0.22 -0.07, 0.04	0.74 <0.001 0.89 0.03 0.17 0.64	0.08	0.51 0.34 0.02 0.34 0.10 -0.02 -0.04	-0.42, 1.43 0.21, 0.47 -0.03, 0.06 0.04, 0.63 -0.03, 0.23 -0.07, 0.04 -0.1, 0.01	0.28 <0.001 0.47 0.02 0.15 0.55 0.14	0.73
Transportation companies[b]	Group Baseline Time Sex Age FAS Group x time	0.29	0.37	0.10, 0.64	0.01	0.23	0.22 0.18 -0.01 0.07 0.03 0.01	-0.26, 0.70 0.06, 0.30 -0.05, 0.03 -0.24, 0.38 -0.11, 0.17 -0.05, 0.07	0.36 0.01 0.75 0.67 0.67 0.75	0.25	0.57 0.18 0.00 0.06 0.03 0.01 -0.03	-0.48, 1.62 0.06, 0.31 -0.05, 0.05 -0.25, 0.38 -0.11, 0.17 -0.05, 0.07 -0.1, 0.04	0.29 <0.001 0.87 0.69 0.69 0.80 0.47	1.02
Town and city planners[b]	Group Baseline Time Sex Age FAS Group x time	0.09	0.27	-0.03, 0.57	0.08	0.11	-0.05 0.28 -0.02 -0.04 -0.03 0.03	-0.56, 0.47 0.16, 0.41 -0.06, 0.02 -0.38, 0.31 -0.18, 0.13 -0.04, 0.09	0.86 <0.001 0.29 0.83 0.74 0.38	0.09	0.61 0.28 0.00 -0.06 -0.03 0.02 -0.05	-0.49, 1.71 0.15, 0.41 -0.05, 0.05 -0.40, 0.29 -0.18, 0.12 -0.04, 0.09 -0.12, 0.03	0.27 <0.001 0.94 0.75 0.72 0.47 0.21	1.00

[a] Varied slightly for the different factors; [b] Single-item; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from four steps in a linear mixed model with country at the upper-level; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score.

Appendix B.3. Difference between the comparison group and Alliance on four factors and five singles item measuring drivers of behaviour in a sample of European adolescents who responded to the CO-CREATE process evaluation questionnaire at baseline and at a measurement point prior to the COVID-19 lockdown policies (n=213[a])

		Step 1	Step 2				Step 3				Step 4			
		ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Access to unhealthy food	Group	0.26	0.24	0.01, 0.44	0.03	0.32	0.06	-0.27, 0.39	0.73	0.24	0.11	-0.60, 0.82	0.76	0.24
	Baseline						0.50	0.37, 0.62	<0.001		0.50	0.37, 0.62	<0.001	
	Time						0.00	-0.03, 0.02	0.75		0.00	-0.04, 0.03	0.87	
	Sex						0.13	-0.09, 0.35	0.25		0.13	-0.09, 0.35	0.25	
	Age						0.06	-0.03, 0.16	0.18		0.06	-0.03, 0.16	0.18	
	FAS						0.01	-0.03, 0.05	0.52		0.01	-0.03, 0.05	0.54	
	Group x time										0.00	-0.05, 0.04	0.87	
Barriers to healthy food and physical activity opportunities	Group	0.11	0.28	0.03, 0.53	0.03	0.13	0.18	-0.23, 0.59	0.38	0.09	-0.02	-0.91, 0.87	0.96	0.12
	Baseline						0.52	0.39, 0.64	<0.001		0.51	0.39, 0.64	<0.001	
	Time						0.00	-0.03, 0.03	0.96		-0.01	-0.05, 0.04	0.78	
	Sex						0.12	-0.16, 0.40	0.41		0.12	-0.16, 0.40	0.38	
	Age						0.04	-0.08, 0.16	0.56		0.04	-0.09, 0.16	0.56	
	FAS						-0.01	-0.06, 0.04	0.65		-0.01	-0.06, 0.04	0.69	
	Group x time										0.01	-0.04, 0.07	0.62	
Social media	Group	0.06	0.61	0.39, 0.87	<0.001	0.07	0.50	0.08, 0.91	0.02	0.04	1.01	0.11, 1.92	0.03	0.06
	Baseline						0.37	0.24, 0.50	<0.001		0.38	0.25, 0.51	<0.001	
	Time						0.01	-0.02, 0.04	0.55		0.03	-0.02, 0.07	0.21	
	Sex						0.08	-0.21, 0.36	0.59		0.07	-0.21, 0.36	0.62	
	Age						0.02	-0.10, 0.15	0.73		0.01	-0.11, 0.14	0.83	
	FAS						0.03	-0.03, 0.08	0.31		0.02	-0.03, 0.08	0.40	
	Group x time										-0.04	-0.09, 0.02	0.23	
Lack of knowledge and understanding	Group	0.00	0.07	-0.13, 0.37	0.60	0.00	0.02	-0.41, 0.45	0.92	0.00	0.01	-0.84, 0.86	0.98	0.00
	Baseline						0.53	0.42, 0.65	<0.001		0.53	0.42, 0.65	<0.001	
	Time						0.00	-0.06, 0.05	0.82		0.00	-0.08, 0.07	0.81	
	Sex						-0.01	-0.27, 0.25	0.95		0.00	-0.27, 0.26	0.98	
	Age						-0.08	-0.19, 0.03	0.17		-0.08	-0.20, 0.03	0.17	
	FAS						-0.02	-0.07, 0.03	0.40		-0.02	-0.07, 0.03	0.40	
	Group x time										0	-0.05, 0.05	1	
Motivation and coping	Group	0.22	0.15	-0.05, 0.36	0.14	0.25	-0.09	-0.40, 0.22	0.55	0.20	0.29	-0.37, 0.96	0.39	0.13
	Baseline						0.56	0.42, 0.70	<0.001		0.56	0.43, 0.70	<0.001	
	Time						-0.01	-0.03, 0.02	0.48		0.00	-0.03, 0.03	0.85	
	Sex						0.28	0.07, 0.49	0.01		0.28	0.07, 0.49	0.01	
	Age						0.05	-0.04, 0.14	0.31		0.05	-0.04, 0.14	0.29	
	FAS						-0.02	-0.06, 0.02	0.34		-0.02	-0.06, 0.02	0.27	
	Group x time										-0.03	-0.07, 0.01	0.19	
Increased use of motorized transportation[b]	Group	0.07	0.44	0.19, 0.72	0.003	0.14	0.16	-0.35, 0.67	0.54	0.11	0.43	-0.67, 1.52	0.44	0.10
	Baseline						0.35	0.21, 0.48	<0.001		0.34	0.21, 0.48	<0.001	
	Time						-0.01	-0.06, 0.03	0.48		-0.01	-0.06, 0.04	0.78	
	Sex						0.06	-0.28, 0.40	0.72		0.06	-0.28, 0.40	0.72	
	Age						0.06	-0.08, 0.21	0.39		0.06	-0.08, 0.21	0.40	

	FAS Group x time						-0.01	-0.07, 0.06	0.84		-0.01 -0.02	-0.07, 0.06 -0.09, 0.05	0.78 0.57	
0Biological factors[b]	Group Baseline Time Sex Age FAS Group x time	0.00	-0.03	-0.27, 0.27	0.80	0.00	-0.09 0.35 0.00 0.07 -0.02 -0.01	-0.44, 0.27 0.23, 0.48 -0.02, 0.03 -0.22, 0.36 -0.15, 0.11 -0.06, 0.05	0.64 <0.001 0.82 0.64 0.72 0.82	0.00	0.25 0.36 0.01 0.08 -0.03 -0.01 -0.03	-0.59, 1.10 0.23, 0.48 -0.02, 0.04 -0.21, 0.37 -0.16, 0.10 -0.07, 0.05 -0.08, 0.03	0.56 <0.001 0.51 0.61 0.65 0.72 0.38	0.00
Lack of time to lead a healthy life[b]	Group Baseline Time Sex Age FAS Group x time	0.08	0.33	-0.00, 0.65	0.05	0.14	0.39 0.52 0.01 0.16 -0.04 -0.03	-0.11, 0.90 0.41, 0.63 -0.04, 0.07 -0.16, 0.48 -0.18, 0.10 -0.09, 0.03	0.11 <0.001 0.46 0.31 0.60 0.39	0.01	0.74 0.51 0.02 0.17 -0.04 -0.03 -0.03	-0.16, 1.65 0.40, 0.62 -0.01, 0.06 -0.15, 0.48 -0.18, 0.10 -0.09, 0.03 -0.09, 0.04	0.11 <0.001 0.17 0.30 0.59 0.35 0.40	0.00
Lack of policies preventing overweight and obesity[b]	Group Baseline Time Sex Age FAS Group x time	0.11	0.29	0.03, 0.57	0.04	0.15	0.08 0.40 -0.01 0.01 -0.07 -0.05	-0.38, 0.53 0.26, 0.53 -0.04, 0.03 -0.3, 0.33 -0.21, 0.06 -0.10, 0.01	0.74 <0.001 0.70 0.94 0.28 0.12	0.12	-0.05 0.39 -0.01 0.02 -0.08 -0.04 0.01	-1.05, 0.94 0.26, 0.53 -0.06, 0.04 -0.30, 0.33 -0.21, 0.06 -0.10, 0.01 -0.05, 0.07	0.92 <0.001 0.63 0.92 0.27 0.13 0.77	0.13
Lack of focus on healthy lifestyle among friends and family[b]	Group Baseline Time Sex Age FAS Group x time	0.04	0.21	-0.07, 0.51	0.17	0.08	0.35 0.33 0.01 0.23 0.05 0.03	-0.15, 0.86 0.19, 0.47 -0.03, 0.06 -0.11, 0.58 -0.10, 0.20 -0.03, 0.10	0.17 <0.001 0.48 0.19 0.55 0.35	0.06	0.65 0.33 0.02 0.23 0.04 0.03 -0.02	-0.44, 1.74 0.19, 0.47 -0.03, 0.08 -0.12, 0.57 -0.11, 0.19 -0.04, 0.09 -0.09, 0.05	0.24 <0.001 0.36 0.20 0.56 0.39 0.53	0.05

[a] Varied slightly for the different factors; [b] Single-item; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from four steps in a linear mixed model with country at the upper-level; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score.

Appendix B.4. Difference between the comparison group and Alliance on four factors and a single item measuring readiness for action in a sample of European adolescents who responded to the CO-CREATE process evaluation questionnaire at baseline and upon completion of the CO-CREATE Youth Alliances (n=195[a])

		Step 1	Step 2				Step 3				Step 4			
		ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Ways of expressing political voice	Group	0.11	0.47	0.21, 0.73	0.002	0.12	0.14	-0.14, 0.43	0.32	0.07	0.82	-0.01, 1.65	0.05	0.09
	Baseline						0.66	0.55, 0.77	<0.001		0.66	0.55, 0.77	<0.001	
	Time						0.00	-0.01, 0.01	0.97		0.03	-0.01, 0.06	0.12	
	Sex						0.01	-0.23, 0.25	0.92		0.01	-0.23, 0.25	0.94	
	Age						-0.01	-0.11, 0.09	0.79		-0.02	-0.12, 0.08	0.72	
	FAS						0.01	-0.04, 0.05	0.79		0.00	-0.05, 0.05	0.97	
	Group x time										-0.03	-0.07, 0.01	0.09	
Competence for civic action	Group	0.00	0.39	0.11, 0.66	0.01	0.07	0.22	-0.05, 0.49	0.11	0.05	0.48	-0.32, 1.28	0.23	0.05
	Baseline						0.59	0.48, 0.70	<0.001		0.59	0.47, 0.70	<0.001	
	Time						0.00	-0.02, 0.01	0.49		0.01	-0.03, 0.04	0.68	
	Sex						0.18	-0.06, 0.41	0.14		0.18	-0.06, 0.41	0.14	
	Age						0.06	-0.03, 0.16	0.19		0.06	-0.04, 0.15	0.23	
	FAS						0.01	-0.03, 0.06	0.60		0.01	-0.04, 0.06	0.73	
	Group x time										-0.01	-0.05, 0.02	0.50	
Advocacy outcome efficacy	Group	0.07	0.20	-0.05, 0.44	0.11	0.09	0.19	-0.08, 0.46	0.17	0.00	0.41	-0.39, 1.21	0.30	0.02
	Baseline						0.44	0.30, 0.58	<0.001		0.43	0.29, 0.57	<0.001	
	Time						-0.01	-0.02, 0.01	0.30		0.00	-0.03, 0.04	0.75	
	Sex						-0.01	-0.24, 0.23	0.96		0.00	-0.23, 0.24	0.99	
	Age						0.06	-0.04, 0.16	0.22		0.06	-0.04, 0.16	0.23	
	FAS						-0.02	-0.07, 0.02	0.31		-0.03	-0.08, 0.02	0.29	
	Group x time										-0.01	-0.05, 0.02	0.51	
Knowledge of resources	Group	0.00	0.04	-0.23, 0.30	0.78	0.08	0.20	-0.10, 0.50	0.19	0.10	0.45	-0.66, 1.12	0.61	0.10
	Baseline						0.41	0.27, 0.54	<0.001		0.07	0.27, 0.54	<0.001	
	Time						-0.01	-0.02, 0.00	0.13		0.02	-0.05, 0.03	0.60	
	Sex						-0.12	-0.37, 0.13	0.36		0.13	-0.37, 0.14	0.36	
	Age						0.09	-0.01, 0.20	0.09		0.05	-0.01, 0.20	0.09	
	FAS						0.00	-0.05, 0.05	0.90		0.03	-0.06, 0.05	0.88	
	Group x time										0.02	-0.04, 0.04	0.94	
Using social networking platforms to discuss a social issue	Group	0.00	0.46	0.12, 0.80	0.01	0.00	0.63	0.21, 1.04	0.003	0.03	0.87	-0.36, 2.10	0.15	0.03
	Baseline						0.54	0.42, 0.67	<0.001		0.55	0.42, 0.67	<0.001	
	Time						-0.01	-0.03, 0.01	0.42		0.00	-0.05, 0.06	0.95	
	Sex						-0.08	-0.43, 0.27	0.65		-0.08	-0.43, 0.27	0.65	
	Age						-0.2+	-0.34, -0.05	0.01		-0.20	-0.34, -0.05	0.01	
	FAS						-0.01	-0.08, 0.06	0.71		-0.01	-0.09, 0.06	0.68	
	Group x time										-0.01	-0.07, 0.04	0.66	

[a] Varied slightly for the different factors; [b] Single-item; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from four steps in a linear mixed model with country at the upper-level; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score.

Appendix B.5. Difference between the comparison group and Alliance on four factors and a single item measuring responsibility in a sample of European adolescents who responded to the CO-CREATE process evaluation questionnaire at baseline and upon completion of the CO-CREATE Youth Alliances (n=195[a])

		Step 1	Step 2				Step 3				Step 4			
		ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Local environment	Group Baseline Time Sex Age FAS Group x time	0.16	0.15	-0.08, 0.37	0.17	0.12	0.14 0.40 -0.01 0.25 0.01 0.03	-0.11, 0.39 0.26, 0.54 -0.02, 0.01 0.04, 0.47 -0.08, 0.10 -0.01, 0.07	0.28 <0.001 0.30 0.02 0.86 0.19	0.16	0.48 0.40 0.01 0.25 0.01 0.03 -0.02	-0.26, 1.23 -0.26, 0.54 -0.02, 0.04 0.04, 0.46 -0.08, 0.10 -0.02, 0.07 -0.05, 0.02	0.20 <0.001 0.04 0.02 0.84 0.22 0.32	0.11
Private business	Group Baseline Time Sex Age FAS Group x time	0.04	0.47	0.17, 0.78	0.01	0.13	0.50 0.31 -0.01 0.36 0.16 0.04	0.14, 0.85 0.17, 0.45 -0.03, 0.01 0.06, 0.66 0.03, 0.28 -0.02, 0.10	0.01 <0.001 0.20 0.02 0.01 0.18	0.11	0.92 0.31 0.01 0.36 0.16 0.04 -0.02	-0.15, 1.99 0.17, 0.45 -0.04, 0.05 0.06, 0.66 0.03, 0.28 -0.02, 0.10 -0.07, 0.03	0.09 <0.001 0.78 0.02 0.02 0.22 0.40	0.11
Food and drink industry / business	Group Baseline Time Sex Age FAS Group x time	0.15	0.30	-0.04, 0.63	0.08	0.23	0.20 0.43 -0.01 0.03 0.07 0.06	-0.18, 0.56 0.30, 0.57 -0.02, 0.01 -0.29, 0.35 -0.06, 0.20 0.00, 0.13	0.31 <0.001 0.55 0.85 0.29 0.05	0.05	0.39 0.43 0.00 0.03 0.07 0.06 -0.01	-0.70, 1.48 0.30, 0.57 -0.04, 0.05 -0.29, 0.35 -0.06, 0.20 0.00, 0.13 -0.06, 0.04	0.47 <0.001 0.90 0.85 0.30 0.07 0.69	0.05
Government / public policy	Group Baseline Time Sex Age FAS Group x time	0.10	0.42	0.11, 0.73	0.01	0.12	0.23 0.27 0.00 0.18 0.08 0.02	-0.14, 0.61 0.12, 0.41 -0.01, 0.02 -0.14, 0.50 -0.05, 0.21 -0.05, 0.08	0.23 <0.001 0.72 0.27 0.25 0.58	0.05	1.29 0.25 0.05 0.16 0.08 0.01 -0.05	0.34, 2.25 0.11, 0.39 0.01, 0.08 -0.15, 0.47 -0.05, 0.21 -0.05, 0.08 -0.09, -0.01	0.01 <0.001 0.01 0.31 0.23 0.69 0.01	0.00
Each individual[b]	Group Baseline Time Sex Age FAS Group x time	0.09	0.13	-0.18, 0.43	0.42	0.31	0.20 0.40 -0.01 0.01 0.09 -0.01	-0.16, 0.56 0.26, 0.54 -0.03, 0.01 -0.29, 0.31 -0.04, 0.21 -0.07, 0.05	0.27 <0.001 0.32 0.94 0.18 0.80	0.20	1.06 0.40 0.03 0.00 0.08 -0.01 -0.04	-0.02, 2.14 0.26, 0.54 -0.02, 0.07 -0.30, 0.31 -0.04, 0.21 -0.08, 0.05 -0.09, 0.01	0.06 <0.001 0.26 0.98 0.19 0.64 0.10	0.18
Schools[b]	Group	0.26	0.31	-0.04, 0.66	0.08	0.12	0.37	-0.01, 0.75	0.06	0.00	0.57	-0.41, 1.55	0.25	0.00

	Baseline Time Sex Age FAS Group x time						0.33 -0.02 0.09 0.13 0.07	0.20, 0.47 -0.03, 0.00 -0.24, 0.42 -0.01, 0.26 0.01, 0.14	<0.001 0.05 0.59 0.08 0.03		0.33 -0.01 0.10 0.12 0.07 -0.01	0.19, 0.46 -0.04, 0.03 -0.24, 0.43 -0.02, 0.26 0.00, 0.14 -0.05, 0.03	<0.001 0.61 0.57 0.09 0.05 0.66	
Companies that help people diet[b]	Group Baseline Time Sex Age FAS Group x time	0.11	-0.05	-0.37, 0.28	0.78	0.11	-0.15 0.34 -0.01 0.40 0.02 0.05	-0.53, 0.23 0.19, 0.49 -0.03, 0.01 0.07, 0.72 -0.11, 0.16 -0.02, 0.12	0.44 <0.001 0.15 0.02 0.74 0.15	0.01	0.56 0.36 0.01 0.41 0.02 0.04 -0.03	-0.74, 1.85 0.21, 0.50 -0.18, 0.20 0.08, 0.73 -0.12, 0.15 -0.03, 0.11 -0.11, 0.05	0.32 <0.001 0.62 0.01 0.81 0.27 0.25	0.00
Transportation companies[b]	Group Baseline Time Sex Age FAS Group x time	0.00	0.33	0.04, 0.62	0.03	0.00	0.42 0.20 -0.01 0.11 0.15 0.02	0.01, 0.81 0.06, 0.34 -0.02, 0.01 -0.24, 0.45 0.01, 0.30 -0.05, 0.09	0.04 0.01 0.35 0.54 0.04 0.60	0.00	0.59 0.20 0.00 0.11 0.15 0.02 -0.01	-0.61, 1.80 0.06, 0.34 -0.07, 0.07 -0.23, 0.46 0.01, 0.30 -0.06, 0.09 -0.07, 0.05	0.30 0.01 0.98 0.52 0.04 0.69 0.72	0.01
Town and city planners[b]	Group Baseline Time Sex Age FAS Group x time	0.07	0.33	-0.02, 0.68	0.06	0.14	0.19 0.33 0.00 0.02 0.08 0.08	-0.22, 0.58 0.21, 0.46 -0.02, 0.01 -0.33, 0.36 -0.07, 0.22 0.01, 0.15	0.37 <0.001 0.74 0.92 0.29 0.03	0.00	0.55 0.33 0.01 0.02 0.07 0.07 -0.02	-0.48, 1.59 0.20, 0.46 -0.03, 0.05 -0.32, 0.37 -0.07, 0.22 0.00, 0.14 -0.06, 0.02	0.29 <0.001 0.60 0.89 0.33 0.05 0.45	0.00

[a] Varied slightly for the different factors; [b] Single-item; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from four steps in a linear mixed model with country at the upper-level; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score.

Appendix B.6. Difference between the comparison group and Alliance on four factors and a single item measuring responsibility in a sample of European adolescents who responded to the CO-CREATE process evaluation questionnaire at baseline and upon completion of the CO-CREATE Youth Alliances (n=195[a])

		Step 1	Step 2				Step 3				Step 4			
		ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC	Estimate	95% CI	p	ICC
Access to unhealthy food	Group	0.15	0.22	-0.04, 0.48	0.09	0.14	0.13	-0.16, 0.43	0.39	0.16	-0.19	-1.09, 0.72	0.68	0.21
	Baseline						0.35	0.21, 0.49	<0.001		0.35	0.21, 0.49	0.00	
	Time						0.00	-0.01, 0.02	0.73		-0.01	-0.05, 0.03	0.61	
	Sex						0.09	-0.17, 0.34	0.50		0.09	-0.17, 0.35	0.49	
	Age						0.07	-0.04, 0.17	0.21		0.07	-0.04, 0.17	0.22	
	FAS						0.04	-0.01, 0.09	0.17		0.04	-0.01, 0.09	0.15	
	Group x time										0.01	-0.02, 0.05	0.46	
Barriers to healthy food and physical activity opportunities	Group	0.07	0.29	-0.03, 0.60	0.08	0.11	0.25	-0.10, 0.61	0.16	0.10	0.30	-0.74, 1.35	0.57	0.10
	Baseline						0.47	0.33, 0.61	<0.001		0.47	0.33, 0.61	0.00	
	Time						-0.01	-0.03, 0.01	0.25		-0.01	-0.05, 0.03	0.71	
	Sex						0.28	-0.02, 0.58	0.07		0.28	-0.02, 0.58	0.07	
	Age						0.02	-0.10, 0.15	0.71		0.02	-0.10, 0.15	0.71	
	FAS						0.01	-0.05, 0.07	0.84		0.01	-0.06, 0.07	0.85	
	Group x time										0.00	-0.05, 0.04	0.92	
Social media	Group	0.02	0.56	0.26, 0.87	<0.001	0.07	0.27	-0.09, 0.62	0.14	0.00	0.84	-0.19, 1.87	0.11	0.04
	Baseline						0.42	0.28, 0.55	<0.001		0.41	0.27, 0.55	<.0.001	
	Time						0.00	-0.02, 0.01	0.78		0.02	-0.02, 0.07	0.25	
	Sex						0.14	-0.16, 0.44	0.36		0.13	-0.18, 0.43	0.41	
	Age						0.05	-0.07, 0.18	0.41		0.04	-0.08, 0.17	0.49	
	FAS						-0.01	-0.06, 0.05	0.86		-0.01	-0.07, 0.05	0.72	
	Group x time										-0.03	-0.07, 0.02	0.24	
Lack of knowledge and understanding	Group	0.04	0.37	0.07, 0.66	0.02	0.11	0.37	0.06, 0.67	0.02	0.02	0.72	-0.21, 1.65	0.11	0.00
	Baseline						0.50	0.38, 0.61	<0.001		0.50	0.39, 0.61	<0.001	
	Time						-0.01	-0.03, 0.00	0.04		0.00	-0.07, 0.07	0.98	
	Sex						-0.16	-0.42, 0.10	0.22		-0.15	-0.41, 0.11	0.24	
	Age						0.02	-0.09, 0.13	0.73		0.02	-0.09, 0.13	0.73	
	FAS						-0.06	-0.11, -0.01	0.03		-0.06	-0.12, -0.01	0.02	
	Group x time										-0.02	-0.06, 0.03	0.36	
Motivation and coping	Group	0.26	0.02	-0.23, 0.28	0.85	0.19	-0.07	-0.36, 0.22	0.63	0.20	0.12	-0.75, 0.99	0.79	0.20
	Baseline						0.40	0.24, 0.55	<0.001		0.40	0.24, 0.55	<0.001	
	Time						0.00	-0.02, 0.01	0.71		0.00	-0.03, 0.04	0.79	
	Sex						0.31	0.06, 0.55	0.01		0.30	0.06, 0.55	0.01	
	Age						0.05	-0.05, 0.15	0.35		0.05	-0.05, 0.15	0.35	
	FAS						0.01	-0.04, 0.06	0.57		0.01	-0.04, 0.06	0.62	
	Group x time										-0.01	-0.05, 0.03	0.65	
Increased use of motorized transportation[b]	Group	0.00	0.10	-0.20, 0.40	0.52	0.00	0.32	-0.09, 0.74	0.13	0.00	0.28	-0.79, 1.35	0.60	0.00
	Baseline						0.24	0.10, 0.38	<0.001		0.24	0.09, 0.38	<0.001	
	Time						-0.02	-0.03, 0.00	0.09		-0.02	-0.05, 0.02	0.38	
	Sex						0.07	-0.29, 0.43	0.72		0.07	-0.29, 0.43	0.72	
	Age						0.11	-0.04, 0.26	0.16		0.11	-0.04, 0.26	0.17	
	FAS						0.00	-0.08, 0.07	0.96		0.00	-0.08, 0.08	0.98	

	Group x time										0.00	-0.04, 0.04	0.93	
Biological factors[b]	Group Baseline Time Sex Age FAS Group x time	0.03	0.15	-0.18, 0.48	0.37	0.06	0.02 0.27 0.00 0.24 -0.01 0.03	-0.38, 0.42 0.14, 0.41 -0.01, 0.02 -0.09, 0.58 -0.15, 0.13 -0.04, 0.10	0.92 <0.001 0.61 0.15 0.91 0.38	0.04	-0.17 0.27 0.00 0.25 -0.01 0.03 0.01	-1.36, 1.01 0.13, 0.41 -0.05, 0.05 -0.09, 0.58 -0.15, 0.13 -0.04, 0.10 -0.04, 0.06	0.77 <0.001 0.95 0.15 0.87 0.39 0.72	0.08
Lack of time to lead a healthy life[b]	Group Baseline Time Sex Age FAS Group x time	0.06	0.28	-0.10, 0.66	0.15	0.15	0.06 0.49 0.01 0.28 -0.01 -0.04	-0.35, 0.47 0.37, 0.61 -0.01, 0.03 -0.07, 0.63 -0.16, 0.13 -0.11, 0.03	0.77 <.0.001 0.20 0.11 0.87 0.30	0.08	0.55 0.49 0.03 0.28 -0.01 -0.04 -0.02	-0.67, 1.76 0.37, 0.62 -0.02, 0.08 -0.07, 0.63 -0.16, 0.13 -0.11, 0.03 -0.07, 0.03	0.37 <0.001 0.21 0.11 0.84 0.25 0.40	0.07
Lack of policies preventing overweight and obesity[b]	Group Baseline Time Sex Age FAS Group x time	0.00	0.14	-0.13, 0.42	0.31	0.00	-0.01 0.44 0.00 -0.03 -0.01 -0.02	-0.38, 0.36 0.30, 0.58 -0.02, 0.01 -0.35, 0.29 -0.14, 0.13 -0.09, 0.04	0.94 <0.001 0.92 0.87 0.92 0.48	0.00	0.24 0.44 0.01 -0.02 -0.01 -0.03 -0.01	-0.70, 1.18 0.3.0 0.58 -0.02, 0.04 -0.34, 0.30 -0.15, 0.12 -0.10, 0.04 -0.05, 0.03	0.61 <0.001 0.64 0.89 0.86 0.40 0.56	0.00
Lack of focus on healthy lifestyle among friends and family[b]	Group Baseline Time Sex Age FAS Group x time	0.06	0.33	-0.03, 0.70	0.07	0.15	0.44 0.30 -0.01 0.25 0.00 0.01	0.00, 0.87 0.15, 0.45 -0.03, 0.01 -0.11, 0.61 -0.15, 0.15 -0.06, 0.08	0.048 <0.001 0.22 0.18 0.99 0.79	0.07	1.75 0.30 0.03 0.22 0.00 0.00 -0.06	0.48, 3.03 0.15, 0.45 -0.03, 0.10 -0.13, 0.58 -0.15, 0.15 -0.08, 0.07 -0.12, 0.00	0.01 <0.001 0.21 0.22 0.99 0.97 0.05	0.01

[a] Varied slightly for the different factors; [b] Single-item; Results are regression estimates (estimate), 95% confidence interval (CI), p-values (p), and intraclass correlation coefficient (ICC) for variance attributed to country effects; Calculated from four steps in a linear mixed model with country at the upper-level; Responses to the factors were given on a 5-point scale ranging from `strongly disagree (=1) to `strongly agree` with a neutral midpoint; Group: comparison = 0, Alliance = 1; Baseline = baseline score.

Appendix 3: CO-CREATE Baseline youth questionnaire

CO-CREATE questionnaire - England (a)

Thank you for filling in the questionnaire!

You can fill in the questionnaire on your mobile, a tablet or a computer. It will take approximately 10 minutes. If there are questions you do not want to answer, feel free to skip these and continue with the next questions.

Before you start please tell us when you were born (month and year).

What is your email address? *

What is your mobile number? *

Remember the country code first: +44 and drop the 0 at the beginning of your number

What year were you born? *

Velg …

What year were you born?

Dette elementet vises kun dersom alternativet «Other» er valgt i spørsmålet «What year were you born?»

Which month were you born? *

Velg …

What is your gender? *

- ○ Female
- ○ Male
- ○ Prefer not to say

Sideskift

Please answer the questions below about political and/or civic engagement

Are you an active member of a political or non-political organisation?

E.g. student council, associations, charitable or voluntary organisations, political parties, youth organisations (political or non-political), religious organizations, youth council, youth parliament

- ◯ No, and I have never been
- ◯ No, but previously
- ◯ Yes

Over the past month, how many times have you:

Expressed concerns online about a social issue?

For example Facebook, Twitter, Instagram, YouTube, Snapchat

- ◯ Never
- ◯ 1-3 times
- ◯ 4-6 times
- ◯ 7-9 times
- ◯ 10 times or more

Collaborated with other people to try to solve a problem affecting your local area

- ◯ Never
- ◯ 1-3 times
- ◯ 4-6 times
- ◯ 7-9 times
- ◯ 10 times or more

Please state whether you agree or disagree with the statements below

I would feel comfortable:

Giving a public talk to a group of people I don’t know about a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Discussing my views in a group of people I don’t know about a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Using social networking platforms to discuss a social issue

For example Facebook, Twitter, Instagram, Snapchat, online comment boxes, YouTube

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Interviewing adults to learn their perspectives about a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Contacting (calling or emailing) someone in a position of influence about a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Doing an interview on radio, TV or for websites about a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Below there are listed different actions to address a social issue. Please state whether you agree or disagree with the statements

Together with other young people, I would be able to:

Contact a local newspaper to get them to address a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Organize a petition to address a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Organize a meeting to address a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Organize a demonstration/strike to address a social issue

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Organize a campaign to get local decision makers to make changes that solve social issues

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Sideskift

Side 5

Please state whether you agree or disagree with the statements below about your local area

I have a pretty good understanding of important social issues present in my local area

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

I believe I can make a difference in my local area

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

I know how policies are made in my local area

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Sideskift

Please state whether you agree or disagree with the statements below

I know where to find trustworthy information about overweight and obesity

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

I know where to find persons or groups who can help:

Prevent overweight and obesity

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Promote healthy diet

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Promote physical activity

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Do you agree or disagree that the following have a role in preventing overweight or obesity in England?

Each individual

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Family and friends

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Schools

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

The media

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Gyms/leisure centres

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree

- ◯ Somewhat agree
- ◯ Strongly agree

Health care professionals

For example doctors and nurses

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Companies that help people diet

For example WeightWatchers or Slimming World

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Employers

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Farmers

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Do you agree or disagree that the following have a role in preventing overweight or obesity in England?

Food and drink manufacturers

For example Coca Cola, Walkers Crisps, Kelloggs

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Supermarkets

- ◯ Strongly disagree
- ◯ Somewhat disagreee
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Restaurants

- ◯ Strongly disagree
- ◯ Somewhat disagreee
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Transportation companies

For example bus, trian, tram, ferry

- ◯ Strongly disagree
- ◯ Somewhat disagreee
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Town and city planners

For example green spaces, cycling paths, commercial areas, housing, schools

- ◯ Strongly disagree
- ◯ Somewhat disagreee

- Neither disagree nor agree
- Somewhat agree
- Strongly agree

The government (national level)

- Strongly disagree
- Somewhat disagreee
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

The government (regional level)

- Strongly disagree
- Somewhat disagreee
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

The government (local level)

- Strongly disagree
- Somewhat disagreee
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Do you agree or disagree that the following factors are causes of an unhealthy lifestyle?

High access to unhealthy food

- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree

- ◯ Somewhat agree
- ◯ Strongly agree

Limited access to healthy food

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Marketing of unhealthy food

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Limited access to physical activity opportunities

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Increased use of motorised transportation

For example car, bus, train

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Being overweight is the new normal

- ◯ Strongly disagree
- ◯ Somewhat disagree

- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Biological factors

For example hunger, taste, genes

- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Lack of knowledge about risk of obesity due to lifestyle choices

- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Lack of understanding of the risk associated with obesity

- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Do you agree or disagree that the following factors are causes of an unhealthy lifestyle?

Insufficient personal motivation to act upon knowledge

- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree

- ○ Somewhat agree
- ○ Strongly agree

Lack of time to lead a healthy lifestyle

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Limited financial resources

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

The lack of policies on preventing overweight and obesity

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Unhealthy food is cheap

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Influence from social media

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree

- Somewhat agree
- Strongly agree

Lack of focus on healthy lifestyle among friends and family

- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Unhealthy coping strategies to stress

For example comfort foods, screen time

- Strongly disagree
- Somewhat disagree
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Below are some questions about you. This is so we know a little about the different backgrounds of the people in the alliance.

In which country were you born?

- England
- Country within Europe
- Country outside of Europe

In which country was your mother born?

- England
- Country within Europe
- Country outside of Europe

In which country was your father born?

- ◯ England
- ◯ Country within Europe
- ◯ Country outside of Europe

Does your family own a car, van or truck?

- ◯ No
- ◯ Yes, one
- ◯ Yes, two or more

Do you have your own bedroom for yourself?

- ◯ No
- ◯ Yes

How many computers do your family own?

Including laptops and tablets, not including game consoles and smartphones

- ◯ None
- ◯ One
- ◯ Two
- ◯ Two or more

How many bathrooms (room with a bath/shower or both) are in your home?

- ◯ None
- ◯ One
- ◯ Two
- ◯ More than two

Does your family have a dishwasher at home?

- ◯ No
- ◯ Yes

How many times did you and your family travel out of England for a holiday/vacation last year?

- ◯ Not at all
- ◯ Once
- ◯ Twice
- ◯ More than twice

Below are questions about habits. This is so we know a little about the different habits of the people in the alliance.

How many times a week do you usually eat or drink:

Fruit

- ○ Never
- ○ Less than once a week
- ○ Once a week
- ○ 2-4 days a week
- ○ 5-6 days a week
- ○ Once a day every day
- ○ Every day more than once

Vegetables

- ○ Never
- ○ Less than once a week
- ○ Once a week
- ○ 2-4 days a week
- ○ 5-6 days a week
- ○ Once a day every day
- ○ Every day more than once

Sweets

For example candy or chocolate

- ○ Never
- ○ Less than once a week
- ○ Once a week
- ○ 2-4 days a week
- ○ 5-6 days a week
- ○ Once a day every day
- ○ Every day more than once

Coke or other soft drinks that contain sugar

- ◯ Never
- ◯ Less than once a week
- ◯ Once a week
- ◯ 2-4 days a week
- ◯ 5-6 days a week
- ◯ Once a day every day
- ◯ Every day more than once

How often do you usually have breakfast (more than a glass of milk or fruit juice)?

Weekdays

- ◯ I never have breakfast during the week
- ◯ One day
- ◯ 2 days
- ◯ 3 days
- ◯ 4 days
- ◯ 5 days

Weekends

- ◯ I never have breakfast during weekend
- ◯ I usually have breakfast on only one day of the weekend (Saturday OR Sunday)
- ◯ I usually have breakfast on both weekend days (Saturday AND Sunday)

Physical activity

Physical activity is any activity that increases your heart rate and makes you get out of breath some of the time. Physical activity can be done in sports, school activities, playing with friends, or walking to school.

Some examples of physical activity are running, brisk walking, rollerblading, biking, dancing, skateboarding, swimming, soccer, basketball, football, & surfing.

For this next question, add up all the time you spent in physical activity each day

Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?

- ◯ 0 days
- ◯ 1 day
- ◯ 2 days
- ◯ 3 days

- ○ 4 days
- ○ 5 days
- ○ 6 days
- ○ 7 days

Do you have any comments on the questionnaire or the CO-CREATE project?

Appendix 4: CO-CREATE Baseline stakeholder questionnaire

Sjekk universell utforming i skjemaet

CO-CREATE questionnaire - England (stakeholder a)

Side 1

Obligatoriske felter er merket med stjerne *

Thank you for filling in the questionnaire!

Please respond to the questions from a professional role (the organization you work for). Please respond to the questions on your own behalf if you do not represent an organization.

What is your email address? *

What is your age? *

- Under 25
- 25-34
- 35-44
- 45-54
- 55-64
- 65 and over

What is your gender? *

- Male
- Female
- Prefer not to say

What is the name of your organization? *

What is your title? *

Which stakeholder category do you represent? *

- ◯ Policy-maker
- ◯ Experts
- ◯ Representative from business
- ◯ Civil society organization
- ◯ Youth and other community member
- ◯ Other

If other, please specify *

Dette elementet vises kun dersom alternativet «Other» er valgt i spørsmålet «Which stakeholder category do you represent? »

Sideskift

Side 2

Obligatoriske felter er merket med stjerne *

Please state whether you agree or disagree with the statements below about your local area

My organization has/I have a pretty good understanding of important social issues present in our/my local area

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

My organization believes/I believe we can make a difference in our/my local area

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

My organization knows/I know how policies are made in our/my local area

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Please state whether you agree or disagree with the statements below

My organization knows/I know where to find trustworthy information about overweight and obesity

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

My organization knows/I know where to find persons or groups who can help:

Prevent overweight and obesity

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Promote healthy diet

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Promote physical activity

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Only those representing an organization should answer the following questions about youth involvement. In CO-CREATE we define youth from the age group 13 to 18 (teenage years) broadly corresponding to secondary/junior high and highschool years. Please state whether you agree or disagree with the statements below

Youth currently play a role in my organization

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

My organization wants to engage youth in its work to further its goals

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

My organization would feel comfortable:

Co-operating together with youth as part of a team

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Asking youth to help work on societal issues we are concerned about

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

My organization practices youth participation in our core activities

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

My organization is trained to work with young people (e.g. using language easily understood by young people)

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

My organization provides youth with training and/or resources to be able to participate in our core activities

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

My organization has allocated budget and staff to ensure, oversee, develop and sustain youth participation

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

I believe that my organization recognises youth participation as a long-term commitment

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

I believe that my organization is prepared to build in changes long term with regards to youth participation (not just as a one-off undertaking)

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

How many times in the last year have youth participated in core activities of your organization?

- ◯ Never/seldom
- ◯ 1-2 times per year
- ◯ 3-4 times per year
- ◯ Bimonthly
- ◯ Monthly
- ◯ Weekly

Sideskift

Side 3

Obligatoriske felter er merket med stjerne *

For all, please answer the following questions.

Do you agree or disagree that the following have a role in preventing overweight or obesity in England?

Each individual

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Family and friends

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Schools

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

The media

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Gyms/leisure centres

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Health care professionals

For example doctors and nurses

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Companies that help people diet

For example WeightWatchers or Slimming World

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Employers

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Farmers

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Sideskift

Side 4

Obligatoriske felter er merket med stjerne *

Do you agree or disagree that the following have a role in preventing overweight or obesity in England?

Food and drink manufacturers

For example Coca Cola, Walkers Crisps, Kelloggs

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Supermarkets

- ○ Strongly disagree
- ○ Somewhat disagreee
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Restaurants

- ○ Strongly disagree
- ○ Somewhat disagreee
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Transportation companies

For example bus, trian, tram, ferry

- ○ Strongly disagree
- ○ Somewhat disagreee
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Town and city planners

For example green spaces, cycling paths, commercial areas, housing, schools

- Strongly disagree
- Somewhat disagreee
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

The government (national level)

- Strongly disagree
- Somewhat disagreee
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

The government (regional level)

- Strongly disagree
- Somewhat disagreee
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

The government (local level)

- Strongly disagree
- Somewhat disagreee
- Neither disagree nor agree
- Somewhat agree
- Strongly agree

Sideskift

Obligatoriske felter er merket med stjerne *

Do you agree or disagree that the following factors are causes of an un-healthy lifestyle?

High access to unhealthy food

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Limited access to healthy food

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Marketing of unhealthy food

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Limited access to physical activity opportunities

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of motorised transportation

For example car, bus, train

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Being overweight is the new normal

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Biological factors

For example hunger, taste, genes

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Lack of knowledge about risk of obesity due to lifestyle choices

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Lack of understanding of the risk associated with obesity

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Sideskift

Side 6

Obligatoriske felter er merket med stjerne *

Do you agree or disagree that the following factors are causes of an un-healthy lifestyle?

Insufficient personal motivation to act upon knowledge

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Lack of time to lead a healthy lifestyle

- ◯ Strongly disagree
- ◯ Somewhat disagree
- ◯ Neither disagree nor agree
- ◯ Somewhat agree
- ◯ Strongly agree

Limited financial resources

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

The lack of policies on preventing overweight and obesity

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Unhealthy food is cheap

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Influence from social media

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Lack of focus on healthy lifestyle among friends and family

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

Unhealthy coping strategies to stress

For example comfort foods, screen time

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither disagree nor agree
- ○ Somewhat agree
- ○ Strongly agree

The CO-CREATE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774210. The products of the research are the responsibility of the authors: the European Commission is not responsible for any use that may be made of them.

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