Supplementary materials

Back on Track: feasibility and efficacy randomized trial of a two-week online self-guided intervention for cannabis use reduction

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Table S1. Subjective goal achievement (N = 152)				
	Estimate	**Est.Error**	**95%CI**	
Intercept [1]	-1.60	0.22	-2.04	-1.17
Intercept [2]	-0.44	0.20	-0.83	-0.06
Intercept [3]	0.78	0.21	0.38	1.19
Condition[CUE]	-0.66	0.24	-1.13	-0.20
Condition[MCII]	-0.90	0.26	-1.40	-0.40
Sex	-0.33	0.32	-0.97	0.30
MINI CUD	-0.27	0.19	-0.10	0.65
PHQ	-0.00	0.21	-0.42	0.42
GAD	-0.25	0.19	-0.62	0.12
Baseline Use	-0.12	0.21	-0,53	0.28
Condition[CUE]*Sex	0.49	0.41	-0.30	1.28
Condition[MCII]*Sex	0.10	0.43	-0.73	0.94
Condition[CUE]*MINI CUD	-0.09	0.24	-0.56	0.39
Condition[MCII]*MINI CUD	0.32	0.28	-0.23	0.88
Condition[CUE]*PHQ	0.14	0.28	-0.41	0.68
Condition[MCII]*PHQ	0.37	0.31	-0.24	0.98
Condition[CUE]*GAD	-0.03	0.26	-0.55	0.48
Condition[MCII]*GAD	-0.28	0.31	-0.88	0.32
Condition[CUE]*Baseline Use	0.19	0.28	-0.35	0.73
Condition[MCII]*Baseline Use	0.23	0.30	-0.36	0.82
Note. The control condition is the reference category. Cumulative probit model, 6 chains, each with iter = 10000, warmup = 2000, thin = 1, total post warmup draws = 48000, all Rhat = 1. CUE: cue-control condition, MCII: mentral contrasting and implementation intentions condition. MINI CUD: mini international neuropsychiatric interview cannabis use disorder, PHQ: patient health questionnaire, GAD: Generalized Anxiety Disorder 7.				

Table S2. Objective goal achievement (N = 152)				
	Estimate	**Est.Error**	**95%CI**	
Intercept	-0.00	0.33	-0.65	0.64
Condition[CUE]	0.44	0.42	-0.37	1.27
Condition[MCII]	0.82	0.45	-0.05	1.72
PHQ	-0.30	0.36	-1.02	0.40
GAD	0.21	0.33	-0.45	0.86
MINI CUD	-0.63	0.34	-1.32	0.03
Sex	-0.29	0.49	-1.25	0.67
Baseline Use	0.12	0.35	-0.56	0.82
Condition[CUE]*Sex	0.38	0.63	-0,86	1.61
Condition[MCII]*Sex	0.19	0.66	-1.10	1.48
Condition[CUE]*MINI CUD	-0.08	0.45	-0.96	0.81
Condition[MCII]*MINI CUD	0.16	0.50	-0.81	1.14
Condition[CUE]*PHQ	0.03	0.48	-0.90	0.96
Condition[MCII]*PHQ	-0.53	0.53	-1.59	0.50
Condition[CUE]*GAD	-0.14	0.46	-1.05	0.77
Condition[MCII]*GAD	0.86	0.,54	-0.18	1.94
Condition[CUE]*Baseline Use	0.38	0.49	-0.57	1.37
Condition[MCII]*Baseline Use	0.31	0.53	-0.72	1.34
Note. The control condition is the reference category. Logit model, 6 chains, each with iter = 10000, warmup = 2000, thin = 1, total post warmup draws = 48000, all Rhat = 1. CUE: cue-control condition, MCII: mentral contrasting and implementation intentions condition. MINI CUD: mini international neuropsychiatric interview cannabis use disorder, PHQ: patient health questionnaire, GAD: Generalized Anxiety Disorder 7.				

Table S3. Grams per week (N = 152)				
	Estimate	**Est.Error**	**95%HDI**	
Intercept	0.63	0.12	0.39	0.87
Timepoint	-0.86	0.12	-1.10	-0.62
Condition[CUE]	-0.19	0.16	-0.50	0.12
Condition[MCII]	-0.48	0.17	-0.81	-0.14
Sex	-0.62	0.21	-1.03	-0.21
MINI CUD	0.33	0.15	0.04	0.62
PHQ	-0.13	0.13	-0.39	0.14
GAD	0.25	0.13	-0.01	0.51
Timepoint* Condition[CUE]	-0.08	0.16	-0.39	0.23
Timepoint* Condition[MCII]	-0.00	0.17	-0.34	0.34
Condition[CUE]*Sex	0.55	0.26	0.04	1.06
Condition[MCII]*Sex	0.39	0.27	-0.16	0.92
Timepoint*Sex	0,05	0.20	-0.34	0.44
Condition[CUE]*MINI CUD	-0.10	0.19	-0.47	0.27
Condition[MCII]*MINI CUD	-0.06	0.20	-0.46	0.34
Timepoint*MINI CUD	-.012	0.14	-0.40	0.17
Condition[CUE]*PHQ	-0.19	0.18	-0.54	0.15
Condition[MCII]*PHQ	0.06	0.21	-0.35	0.46
Timepoint*PHQ	0.03	0.13	-0.23	0.29
Condition[CUE]*GAD	-0.11	0.17	-0.44	0.22
Condition[MCII]*GAD	0.08	0.19	-0.28	0.45
Timepoint*GAD	-0.09	0.13	-0.36	0.18
Timepoint*Condition[CUE]*Sex	0.07	0.26	-0.43	0.57
Timepoint*Condition[MCII]*Sex	0.03	0.27	-0.50	0.57
Timepoint*Condition[CUE]*MINI CUD	0.03	0.19	-0.34	0.40
Timepoint*Condition[MCII]*MINI CUD	0.23	0.21	-0.18	0.64
Timepoint*Condition[CUE]*PHQ	0.05	0.18	-0.30	0.40
Timepoint*Condition[MCII]*PHQ	-0.28	0.21	-0.69	0.14
Timepoint*Condition[CUE]*GAD	0.07	0.17	-0.26	0.41
Timepoint*Condition[MCII]*GAD	0.08	0.19	-0.29	0.46
Note. Logit model, 6 chains, each with iter = 10000, warmup = 2000, thin = 1, total post warmup draws = 48000, all Rhat = 1.				

Appendix A – Two examples of the personal implementation of interventions

Goal setting

Individual 1

- Week 1: None
- Week 2: None

Individual 2

- Week 1: Friday
- Week 2: Friday

Mental contrasting

Individual 1

- Positive outcome: Better memory
- Positive outcome thoughts: I think I will be better able to get good grades on my next exam. I hope I will feel more free than I did before.
- Obstacle: Sadness
- Obstacle thoughts: Sitting alone in my room and knowing that with just one joint I can forget all the problems of the world for a few hours.

Individual 2

- Positive outcome: Less lazy
- Positive outcome thoughts: I will be less lazy and able to focus more on Uni. I would also like to do other things with friends than smoking cannabis.
- Obstacle: Boredom
- Obstacle thoughts: I usually use cannabis when I am bored or meet up with friends and we do not have anything planned in particular.

Implementation Intentions

Individual 1

- If I feel sad, I will call a friend.

Individual 2

- If I am bored, I will start reading.

Cue control

Individual 1

- Remove cues: I will throw away everything related to cannabis use (paper, tips, grinder)
- Create obstacle: Having to go to the store and buy new stuff should be enough but I can remind my friends to not invite me to smoke evenings.
- New cues: Keep my room clean so it does not look so depressing.

Individual 2

- Remove cues: I will put all things in a specific box and put it out of sight.
- Create obstacle: As mentioned before, looking for the box is an obstacle.
- New cues: I could leave books on my desk and nightstand instead of putting them in the bookshelf. That way I do not have to go to my bookshelf and I already would have selected a book.

Appendix B – Intervention Website Homepage

Self-guided approaches to cut down on cannabis use

Do you want to cut down on your use of cannabis?

It can be easy to fall into habits that we would rather not have, such as excessive snacking, drinking, or smoking. During times of stress, or when our normal daily lives have been disrupted – such as with many stay-at-home, social distancing, or lockdown measures due to coronavirus – it can be even easier to develop unwanted habits. Some people may find their use of cannabis has increased during this time period.

'Back on Track' is a study from researchers at the University of Amsterdam that aims to test ways people can help themselves to cut down on their unwanted use of cannabis. If you have found that you are using cannabis more than you would like – perhaps because your use has increased recently, or simply because you have decided you would like to cut down – taking part in Back on Track might be helpful for you!

What is Back on Track?

Back on Track is a research study aimed at helping people reduce unwanted use of cannabis. Participants will be randomly put into different self-guided interventions, which differ in their level of instruction. The interventions focus on setting a goal for your use each week, over a 2-week study period, and seeing your level of success in achieving that goal. The interventions are based on psychological research, but it is not guaranteed that you will benefit from taking part – this research is being conducted to find out how people can get the most benefit from such interventions!

What is Back on Track NOT?

Back on Track is not a treatment for cannabis addiction/dependence or cannabis use disorder, nor is it a treatment for any other mental health condition. It is solely intended as a low-intensity intervention to help people who feel they have started using more cannabis than they would ideally like, to cut down their use to a level they find acceptable. If you do not wish to cut down on your use of cannabis or are concerned that you may for some reason might be negatively affected by cutting down, then Back on Track is not appropriate for you. Back on Track is also not telling people they must not use cannabis – it is only for people who want to cut down.

What does taking part involve?

1. First assessment. Completing some questionnaires about your current cannabis, alcohol, and tobacco use, as well as mental health and demographic information. Duration: up to 30 minutes.

2. Explanation of the intervention. Once your assessment is completed, you will be randomly assigned to a self-guided intervention. All interventions involve setting your own goal for how much cannabis you will use. Each then comes with some guidance for how you might achieve that goal. It will be your job to use your goal and the guidance given over a two-week period to achieve your target use. Duration: 2 weeks, with duration determined by how much you do.

3. Second assessment (end of week 1). After one week, you will answer several questions about your cannabis, alcohol, and tobacco use over the last week, as well as how well you believe you have achieved your goals. Duration: Up to 20 minutes

4. Third assessment (end of week 2). After two week, you will again answer some questions about your cannabis, alcohol, and tobacco use over the previous week, and your assessment of goal achievement. You will also be asked to indicate some ways in which you tried to take action in achieving your goals. Duration: Up to 30 minutes

What's in it for me?

Alongside the possibility of reducing your use of cannabis, participation means that you can be included in a lottery where it is possible to win 25 Euros, or the equivalent in US dollars, British pounds, or Bitcoin at the time the prize winners are selected.

Who can take part?

In order to take part, you must:

Be 18 years of older

Use cannabis at least once per week and want to cut down

Be fluent in either English or Dutch

Back on Track is a research project from members of the University of Amsterdam ADAPT lab and Clinical Psychology Department. Contact information for the researchers is available when you click the 'XXXXXXX' link!

Appendix C – Goal Setting Instructions

Goal Setting

The best way to set goals

Choosing the right goal for you is important in helping you to succeed. Sometimes we set goals that don't excite us, that are too vague, or too difficult. Setting a goal that is not appropriate to our situation is one of the reasons why we sometimes can't achieve what we set out to do. In this study, we aim to help you choose the right goal for you, so that you can stick to it and succeed!

To do this, we follow the SMART goal-setting guidelines. These guidelines are used to help people from all walks of life get where they want to be, from students studying for their exams to top athletes setting records. You might already know about these or similar guidelines, but knowing about them and really using them are two different things! Choosing a SMART goal can help you to succeed.

Specific

Measurable

Attractive/Appealing

Realistic

Time-bound

What makes a SMART goal?

Specific – A good goal for reducing cannabis will go beyond just 'I will to reduce my use of cannabis'. Be specific in your goal by giving a specific number of times that you intend to use cannabis, and a specific number of grams that you intend to use. To be even more specific, you can choose particular days where you will use cannabis.

Measurable – Now that your goal is precise, it is possible to measure it. You can keep track of how many times and how much cannabis you have used. At the end of week 1 and week 2, you will be asked to report your use. This not only helps us understand people's success in the study – it helps you see how well you are doing. When you measure your goals, you are accountable and really know when you have succeeded!

Attractive/Appealing – Of course, your goal must be exciting. There's no use having a goal if you won't be pleased when you achieve it!

Realistic – But your goal must also be realistic or achievable. You must strike a balance between a goal that is both attractive and realistic. If you set your sights *too* high, you might set yourself up to fail and be disappointed, even if you made great progress.

Time-bound – Your goal should include a clear time-frame for you to take action in

How can I make a SMART goal that works for me?

We are helping you to make a SMART goal. In the survey, you are provided with space to make a Specific and Measurable goal: you just need to choose your target of use, and put the numbers in. Your goal will be sent to you via email once you fill it in. We also help you keep track of your progress by measuring how you are doing one week from now, and again two weeks later.

We also help to make your goal Time-bound. Your goal covers how much you will use each week in the next two weeks – the time you are taking part in the study. Two weeks is a great period of time to try out a new goal: not too short that you can't really tell if you are succeeding, but not too long that you are stuck with a goal that you might want to change later.

The key thing that you need to do is to focus on making your goal both Appealing and Realistic for *you*. Everyone's situation and goals will be different, so it is important that you think for yourself and choose a goal that you will be happy with achieving, and that you also think is possible for you to do this week and the next.

For example, if you are currently using cannabis pretty much every day, you might want to cut out using completely. This is certainly possible, but it might also be unrealistic for some people to do straight away. However, changing from using 7 times a week to 6 times a week might not be very exciting for you, and reduce your motivation to achieve it.

Set your goal!

Think carefully about your situation, what you would really like, and what is realistic. Then, choose a specific target for your use, which will be your goal for the next two weeks. Choosing a SMART goal is the best first step to reducing your use.

Now, go back to the survey page and fill in your goal! You can do this by clicking the next button, and filling in your goals in the space that says *"Set your goal!."*

Your goal for use starts officially tomorrow!

Appendix D – Mental Contrasting and Implementation Intentions Instructions

Implementation Intentions

Breaking through barriers to achieving your goal

A few minutes ago, you set a goal for yourself to reduce your cannabis use to a target amount that you decided on yourself. On this page, we explain a tried and tested technique for helping people achieve their goals: using "Implementation Intentions". In short, making Implementation Intentions involves 1) imagining the positive outcome of achieving your goal; 2) seeing obstacles that might stop you from getting there, and then 3) coming up with n 'if-then' plan for how to overcome these obstacles.

Using this technique has been found to be effective in reducing many unwanted habits in a lot of past research! For the best results, Implementation Intentions must follow a specific form. Below, we explain to you how you can make your own Implementation Intentions to achieve your goals.

Positive Outcomes of your Goal

What would be the most positive aspect or outcome of successfully reducing your cannabis use? For example, reducing your use of cannabis might help you to feel fresh and awake in the mornings. Another possibility would be that you might eat more healthily and feel better, because you will have less junk food cravings than when you are high. Or you might have more money so you can buy yourself or someone you care about something nice. It's important to think of positive outcomes of reducing cannabis use that really matter to *you*.

Now, think of a word or short phrase that really spells out or represents that positive outcome for you. In the survey, press the *next* button and type that word or phrase in the space labeled *positive outcome*. Ideally, you can also write it down in your phone, a notepad, or piece of paper too!

Imagine the events and experiences that are linked with that outcome. Let your imagination run freely, and write down the thoughts and images that come to mind when you think of these positive events and experiences. Type these thoughts and images into the space in the survey labeled *positive thoughts*. Ideally, you can also write these down in your phone, a notepad, or piece of paper as well.

Obstacles to Achieving your Goal

Sometimes people do not achieve their goals even when they are very motivated. This is often because 'obstacles' get in their way. Recognizing these obstacles can really help you achieve your goals.

What situations, or 'obstacles' could make it hard for you to achieve your goal of reducing your cannabis use? For example, some people might say their biggest obstacle to using less cannabis is boredom. When they are feeling bored, they use cannabis to deal with that feeling.

What is the most important obstacle to using less cannabis for *you personally*? Write it down in one word in the space labeled *obstacle* in the survey. Now, try to imagine the events and experiences that are linked with this obstacle. Let your imagination run freely, and write down the thoughts and images that come to mind when you think of the events and experiences related to this obstacle. Type these thoughts and images into the space in the survey labeled *obstacle thoughts*. Ideally, you can also write these down in your phone, a notepad, or piece of paper as well.

Create Your Implementation Intentions

One way to overcome an obstacle is to make a plan for what you will do when you encounter it. Now that you have recognized a major obstacle, you can tackle it more easily. Back to our boredom example!

Although it would be great if we could figure out how to never be bored, it is not very likely. Instead, you can make a plan for what you will do when you are feeling bored instead of using cannabis. For example, you might make the following plan: "If I am feeling bored (obstacle) and I feel like using cannabis, then I will watch a favorite TV show or go for a walk outside (or other activity you enjoy) instead."

We've given some examples of what an Implementation Intention might look like below. Remember that yours must be specific to your obstacles and alternatives.

Now use the biggest obstacle you identified above to create your own plan in this form:
If [OBSTACLE] and I feel like using cannabis, then I will [Alternative] instead.

In the survey, fill out your plan in the space labeled 'Create your plan!'

It can be really helpful to also write your plan down in your phone, in a notepad, or on a piece of paper too, so that you can easily refer back to it.

Setting goals and plans can help you gain control of your cannabis use and make choices for yourself, but it has to be maintained. If you find you have used in a way that does not fit your goals despite this technique, it is okay. Just focus on what you think caused your use, and whether there is something you can add using this technique that would prevent that from happening again.

Need Some Inspiration for Alternatives?

If you are struggling for ideas of alternatives, we've created a list of some options for things you might think of doing instead below. Even though your country might be under some sort of lockdown measures, there are still a lot of possibilities for things you could do. If you usually use cannabis quite a lot, you might benefit from making some extra implementation intentions with other alternatives. This would be helpful, for example, if your alternative is something you cannot do as regularly as would be needed for it to be useful as an alternative all the time.

Watch a movie/TV show
Call/text/video chat with a friend/family
Read a book
Do some exercise
Meditate
Play with a pet/teach them a new trick
Play video games
Go for a walk
Play a game with your kids
Draw/Paint/Create art!
Learn/play a musical instrument
Listen to a podcast
Listen to music
Learn a new skill
Do some baking!
Play a sport

Remember that there are many resources on the internet, like YouTube channels that teach you new skills and information, interesting conversations, great music, or have ideas for exercises and routines. You can also find many free courses online, and streaming services to find entertainment.

Boredom

IF I am feeling bored and feel like using cannabis

THEN I will watch my favorite TV series instead

Sleep

IF I can’t sleep and feel like using cannabis

THEN I will listen to music that relaxes me

Stress

IF I am feeling stressed and feel like using cannabis

THEN I will do a 10 minute breathing meditation instead

Appendix E – Cue-Control Instructions

Cue Control

Take control of your environment to achieve your goal

We've already covered how situations can come up that present obstacles for reducing your cannabis use. Objects around you can also be obstacles to achieving your goal of reduced use, because they grab your attention and remind you of cannabis. These might include lighters, rolling papers, grinders, and cannabis itself among many other items. Research shows that objects linked with cannabis — or 'cannabis cues' — can trigger cravings in regular cannabis users. Sometimes, you might not even be aware of how this is affecting you.

A great way to tackle this obstacle is with a technique called "Cue Control". In short, cue control focuses on three key factors:

The 3 keys of Cue Control

1. Reducing the chances that your unwanted habits are triggered by removing cues from the environment

2. Placing an obstacle or gap between urges to use and actual use

3. Removing obstacles and increasing cues for habits or behaviors that you *do* want

Think of your environment at home now. You might have cannabis or rolling papers in your wallet or purse, and a lighter or ash tray in sight on the table. 'Cues' like these can easily remind you of using cannabis and trigger urges. When you get that urge, it's also really easy to act on it, because everything is right there waiting for you. In your implementation intention, you have made an alternative plan to do something else instead of using cannabis. Imagine you planned to do something creative in that time like creating a painting or drawing. All your equipment might be in the back of a cupboard and you don't know where you have any paper!

Your environment makes it easier to follow your habit or urge than to do what you decided you wanted to earlier.

To achieve your goal of reducing use, you can use *Cue Control* to rearrange your environment, making it harder to follow urges and easier to follow your positive choices. Below are some specific things that you should do for the next two weeks.

Reduce cues for use and make an obstacle between urges and actual use

Remove cannabis-related material from your close surroundings and put them in another place. Gather up the items that you use when you use cannabis or that remind you of cannabis use and place them in a box, container, or bag. Put that bag in an out of view and preferably hard or slightly annoying to reach location (e.g., high up on a shelf, at the back of a cupboard, or under the kitchen sink!). Removing cues helps to reduce the chances that your urges are triggered.

Making it a bit more difficult or annoying to actually reach cannabis material also gives you some time to pause and think before using, so that you can remember your long-term goals and see if using right now fits with those goals. If your use is planned and part of your goal amount, that's okay.

If not, then you have some time to decide whether or not you want to use. You may find that just having time to pause and think already leads to the urge getting lower.

Extra steps:

If you want to go a step further to help remind yourself of your goals, you can write down the target you set for yourself (for example, only using 2x per week) and one or more of the plans you created above for what to do when you experience an obstacle to achieving your target. Tape this piece of paper to the box you placed your cannabis material or in a prominent place you can see when you are going to get the cannabis box.

If you want to go a step further in placing obstacles between urges and use, you can think of splitting your cannabis use materials in two places out of sight and hard to reach. Make it so you have to get both in order to use. That means you have to make a more active choice to get the materials from both places in order to use.

Increase cues for your positive behaviors, and remove obstacles to positive actions

From working with ideas for creating your own implementation intentions, you should have thought of several possible things you can do instead of using cannabis. It is important to help yourself do these things!

How you would do this can vary a lot depending on what the alternative behavior is, but one clear thing is to make a list of different possibilities that you can easily refer to. Strange as it seems, you can easily forget the ideas you had of what to do, or only remember some of them. If you aren't sure what to do or remember one option but don't want to or cannot do it right now, then you can check out your list to jog your memory for other ideas.

Arrange your environment to remind yourself of these other things to do, and to make it as easy as possible to do them.

For example, if you wanted to restart playing that instrument you haven't played for ages, make sure it is cleaned up and ready to use at a moment's notice. Put it somewhere easy to reach. You could have a music book waiting ready on the table, or some instruction videos bookmarked in Youtube ready to watch. If your behavior is just going for some fresh air and a walk, make sure you have a clear place where your house-keys are, and that any particular clothing you might need is easy for you to slip into!

Now, go to the survey and fill in some ideas you've had for how you could change your surroundings to make it easier to control your use, and easier to do your alternatives. You might not be able to think of every possibility right now. If you think of things later or throughout the week, you can do those as well as whatever you can think of at the moment. Of course, just *thinking* of these things is not enough. Make sure that you actually do them as soon as you can.

Using Cue Control can help you gain control and make choices for yourself, but it has to be maintained. Remember that after you use cannabis, it is important to return your environment to a 'cue-controlled' state – putting materials back in their place and throwing out used joints or things that might be a new cue to use. If you find you have used in a way that does not fit your goals despite this technique, it is okay. Just focus on what you think caused your use, and whether there is something you can add using this technique that would prevent that from happening again.

Reduce unwanted use by removing cues and increasing obstacles
Increase alternative positive behaviors by adding cues and removing obstacles