Disrupting Social Media Habits

— a Field Experiment with Young Danish Consumers

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Disrupting Social Media Habits – a Field Experiment with Young Danish Consumers Social Media Habits

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Executive Summary

The Danish Competition and Consumer Authority (DCCA) conducted a randomized field experiment to assess the effects of three behavioral interventions—reflection, planning, and waiting—on the social media activity of 269 Danish adolescents aged 13–17 years. In the experiment, the participants were requested to install the app, one sec, that recorded their social media activity. The app also enabled different behavioral interventions to trigger when participants accessed social media platforms via their smartphones. The analysis provides a unique and detailed perspective on young consumers' social media habits including during school hours. After implementation the interventions consistently reduced social media activity between 31-36% without adverse effects to the overall satisfaction derived from using these. For an average user, who spends 3 hours on social media daily, this equals 65-56 minutes less time spent on social media per day.

In particular, the effects were pronounced during the periods in which using social media may exhibit adverse effects on the lives of the young consumers—such as school hours and at bedtime. During the school hours, the interventions caused a 50% decline in participants' tendency to use social media, resulting in a 40% reduction in the overall daily time spent on social media activities. The reduction in social media use in the late evening and around bedtime resulted in nearly 16 minutes of additional uninterrupted time during the night.

The intervention effects were stronger among participants who used social media more heavily, those with lower self-control, and those reporting higher levels of social media addiction.

The experiment evaluated the following three interventions:

» **Reflection:** Every fifth time the participants opened social media, the intervention app asked them to briefly reflect on their reason of opening the social media app and their feelings at that moment.

» **Planning:** Every time the participants opened social media, the intervention app asked them to enter a time estimate regarding how long they intended to engage with the given platform, and received reminders if they exceeded that duration.

» **Waiting:** Every time the participants opened social media, the intervention app forced them to pause for six seconds before accessing the given platform.

The results clearly demonstrated that, among the behavioral interventions, planning and waiting were most effective whereas reflection only had negligible effects on social media consumption of the young consumers. Notably, participants' overall satisfaction with social media remained unaffected by the interventions, indicating that the effects were achieved without compromising the user experience.

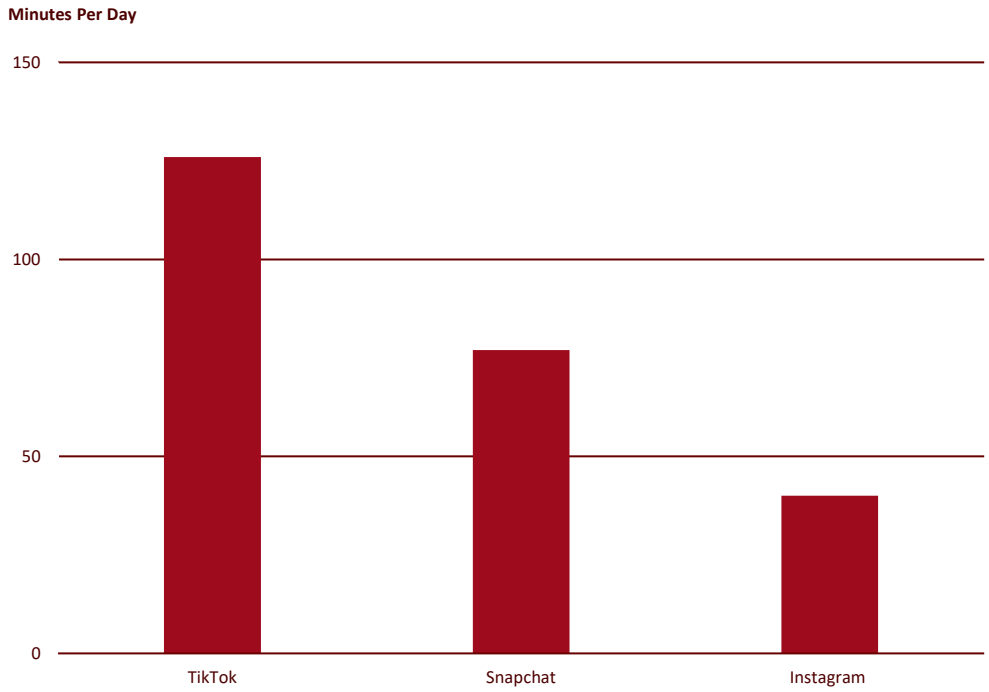
In the nutshell, the experiment shows that subtle, timely prompts can help us reduce social media overuse without removing or limiting the number of choices. In particular, such an approach may bring the largest benefits to those who struggle the most to disengage from social media.

High and Sustained Social Media Use

The experiment began by tracking participants' use of social media for two weeks without any behavioral intervention. Data from this initial phase offered a detailed overview of today's young consumers' social media activities, thus serving as a reference point for a comparative analysis to understand the effects of the three behavioral interventions.

Participants spent an average of 3 hours and 19 minutes daily on social media during the baseline period with TikTok, Snapchat and Instagram accounting for most of the activity (cf. Figure 0.1). TikTok sessions were also the longest, averaging 5 minutes and 48 seconds, whereas Snapchat was accessed most frequently, with a median of 25 sessions per day. Platforms such as YouTube, Reddit, and BeReal took on more secondary roles.

Figure 0.1 **Average Daily Activity on the Most Frequently Used Platforms**



Note: The figure shows the average daily activity, as the total time spent on the three most preferred social media apps.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

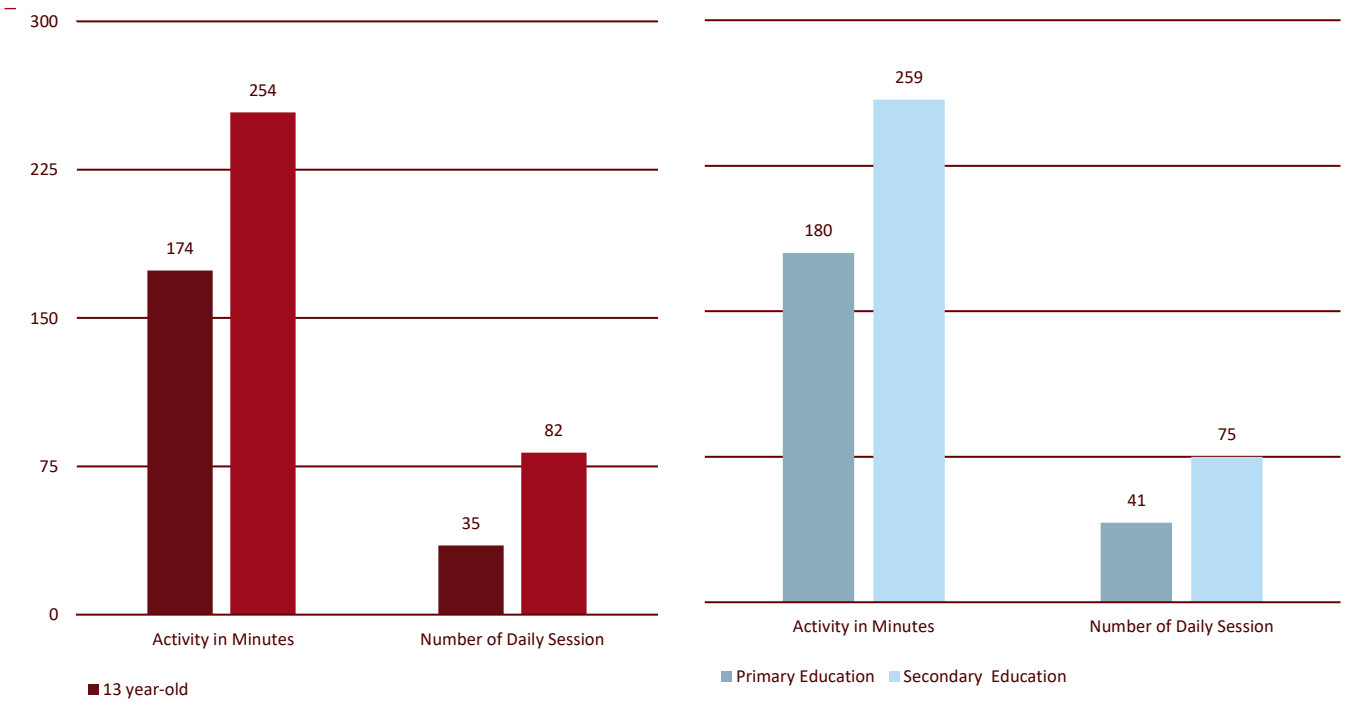
Age and Educational Contexts Shape Patterns of Social Media Activity

Participants' social media behavior differed across their age and educational level. In terms of total duration and frequency of sessions, older participants, particularly those aged 17 years, were more intensively active on social media platforms than their younger counterparts. Similarly, participants pursuing secondary education were more active on social media than those in primary school. Notably, sessions of younger participants on social media platforms were fewer but longer cf. Figure 0.2.

Figure 0.2 **Daily Activity and Number of Sessions on Social Media Platforms Based on Age and Education**

(a) Activity Based on Age

(b) Activity Based on Education



Note: (a) The figure on the left (with red bars) illustrates activity and the number of social media sessions everyday by the youngest (13 years old) and oldest (17 years old) participants in the experiment, whereas (b) the figure on the right (blue bars) illustrates activity and sessions by pursuing primary and secondary education.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

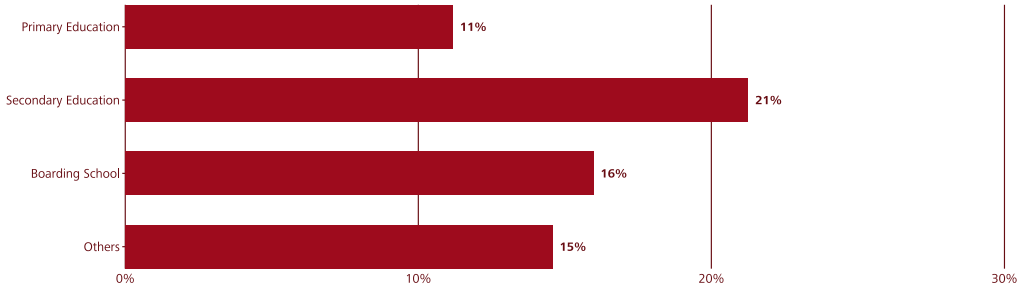
Social Media Activity Follows Daily and Weekly Patterns

Social media activity maintained a consistent pattern throughout the day and week: It typically started between 06:00 and 07:00, caught steady momentum during morning and afternoon, and peaked between 15:00 and 22:00. After 22:00, the activity decreased significantly. Overall, the busiest time was Saturday between 17:00 and 18:00, when 77% of participants opened at least one social media app.

Participants stayed active on social media platforms for a significant amount, 14.5%, of their school hours. There are however, considerable differences in the participants' social media activity across different educational levels: primary school students spent 11% and secondary education students spent 21% of a typical school day actively engaged on social media (Figure 0.3).

On weekdays between 07:00 and 23:00, participants spent an average of 3 hours on social media—equivalent to 18.8% of the period.

Figure 0.3 **Percentage of Social Media Activity during School Hours (8:00 – 14:00) Based on Educational Levels**



Note: Bars represent the percentage of students' social media activity during school hours, compared to the total available time in this period. Periods of Fall and Christmas breaks were excluded for the analysis

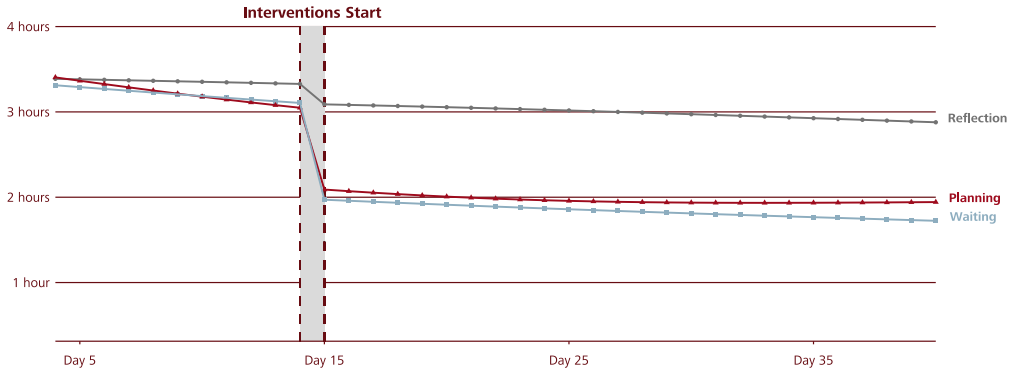
Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

Interventions Reshape Digital Habits, Reduce Use, and Improve Sleep—Without Compromising the Social Media Experience

The Planning and Waiting interventions led to significant reductions in social media activity (see Figure 0.4). Participants in the Planning group reduced their daily social media usage by 31%, which equates to 56 minutes for an individual who spent 3 hours daily. Meanwhile, participants in the Waiting group reduced their daily usage by 36%, or 65 minutes, for someone with a baseline of 3 hours per day. There were, however, only minor changes to the reflection groups daily social media usage, which likely reflects that the intervention only triggered on every fifth session.

These reductions were observed immediately upon introduction of the interventions and remained consistent over the four-week period.

Figure 0.4 **Estimated Daily Activity on Social Media Apps across the Baseline and Intervention Periods**



Note: The figure shows the estimated activity in minutes across the intervention period (four weeks) for the three experimental conditions: Reflection (gray line), Planning (red line), and Waiting (blue line). Solid lines represent model-predicted daily time. The vertical dashed lines mark the transition between the baseline period and the intervention period.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

The Planning Intervention Helped Vulnerable Consumers More

The results show that young people with high levels of social media use, heavy users[1], responded most strongly to the interventions. In addition, the effects were particularly pronounced in the Planning group among participants with low self-control and high levels of social media addiction—these vulnerable groups showed the largest reductions in daily usage. In the Waiting group, the effect was more evenly distributed across profiles related to self-control and addiction, with strong reductions in daily activity regardless of behavioral disposition. In fact, a slightly reversed pattern was observed with respect to self-control, where participants with higher self-control reduced their usage the least. In the Reflection group, the effects were consistently the weakest, and no clear differences were observed based on self-control or addiction levels.

Specifically, participants with the highest baseline usage saw the most substantial reductions: 42% in the Waiting group and 37% in the Planning group. For a typical heavy user (with a baseline of 4 hours and 20 minutes per day), this corresponds to a reduction of 1 hour and 48 minutes and 1 hour and 36 minutes, respectively (cf. Figure 0.5).

The Planning intervention also demonstrated a particular sensitivity to participants' psychological profiles. The effects were most pronounced among those with high addiction and low self-control. Participants with high addiction reduced their daily usage by 38%, compared to 23% for those with low addiction (cf. Figure 0.6). Similarly, participants with low self-control reduced their use by 36%, compared to 25% among those with high self-control (cf. Figure 0.7).

Participants who exhibited all three characteristics—high usage, low self-control, and high addiction—showed substantial and overlapping effect sizes, consistent with previous findings. Research has shown that low self-control and high social media addiction are often interrelated and associated with more intensive media use.[2] Thus, the effectiveness of the intervention appears to depend not only on the amount of baseline use but also on the participants' behavioral tendencies.

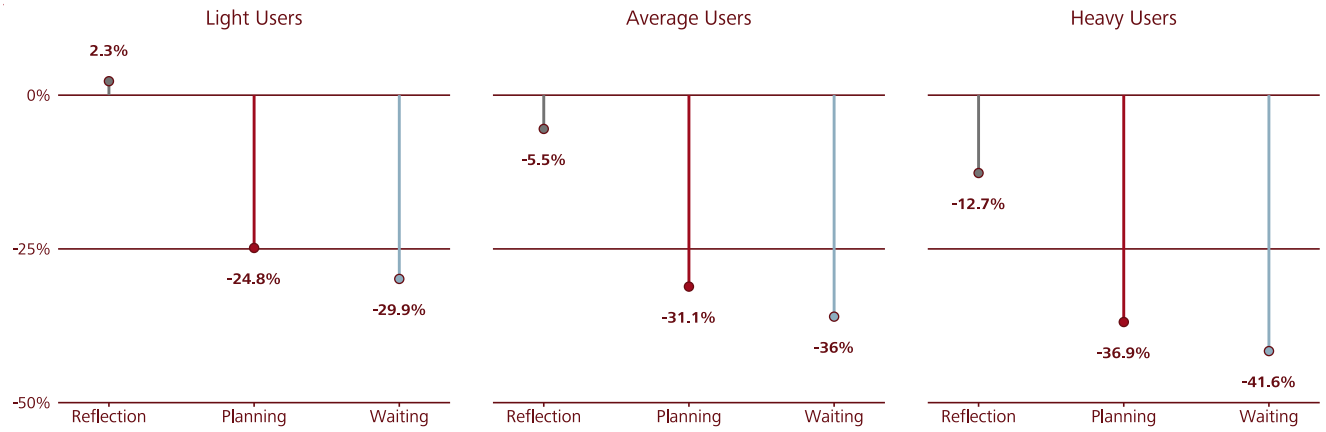
By contrast, the effects observed in the Waiting group, as noted, were more uniformly distributed across user profiles. Reductions remained stable between 30 and 40%, regardless of addiction or self-control levels—with slightly greater reductions among those with high self-control.

The Reflection group consistently showed the smallest effects, even among participants with high addiction or low self-control, with reductions markedly lower than those observed in the Planning and Waiting groups.

Figure 0.5 **Predicted Social Media Activity Based on Intervention Group, Intervention Period, and Intensity of Use**

[1] Heavy users are defined as those whose baseline social media use is one standard deviation above the mean, corresponding to an average daily use of 4 hours and 20 minutes.

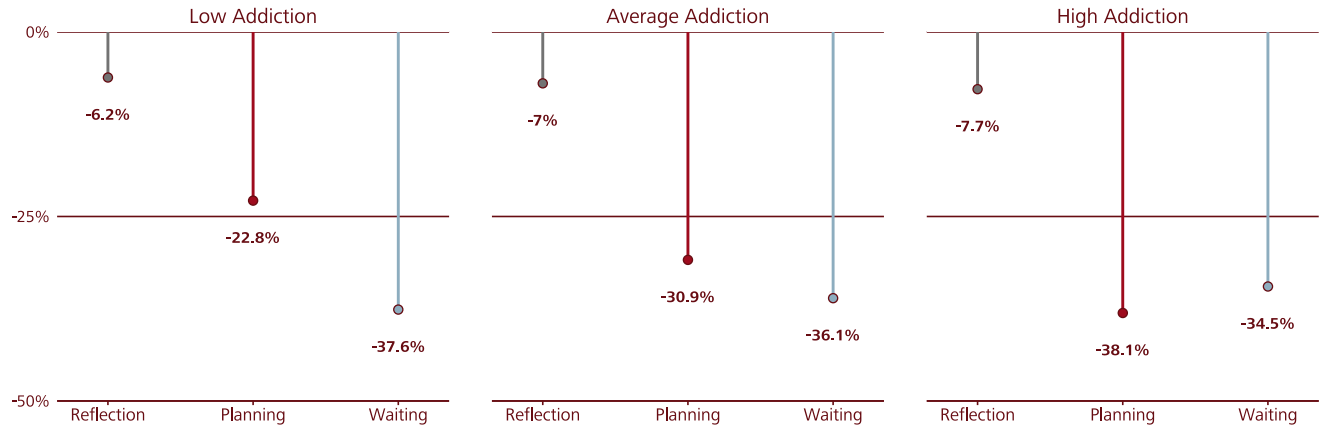
[2] Danish Competition and Consumer Authority (2025): Young Consumers and Social Media,



Note: The y-axis shows the predicted change in daily social media activity from baseline to intervention period. Each vertical segment represents the estimated change (either reduction or increase) for participants in the Reflection (gray), Planning (red), and Waiting (blue) group. Points indicate the predicted percentage change from baseline to intervention period. The results are presented separately for light, average, and heavy baseline users (from left to right), defined as ±1 standard deviation from the sample mean.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

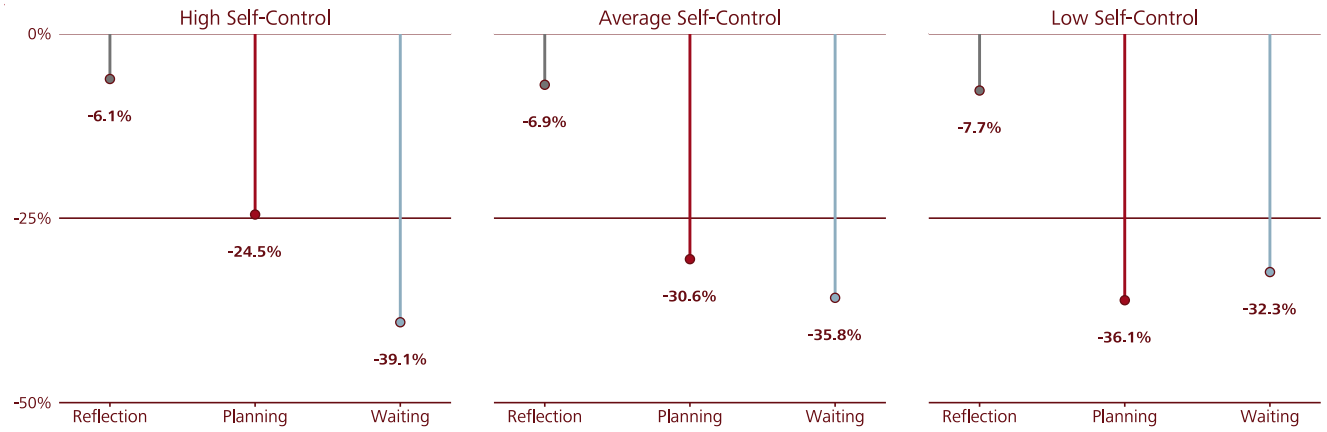
Figure 0.6 **Predicted Changes in Daily Activity on Social Media Based on Participants' Addiction Levels and Intervention**



Note: The figure shows model-predicted changes in average daily activity on social media between the baseline and intervention periods, categorized by social media addiction level (low, average, and high) and intervention (Reflection, Planning, and Waiting). Vertical lines represent the predicted percentage change from baseline to intervention. Predictions are based on a gamma-distributed mixed-effects model that includes social media addiction as a standardized moderator.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 0.7 **Predicted Changes in Daily Activity Based on Participants' Level of Self-Control and Intervention**



Note: The figure illustrates model-predicted changes in average daily social media activity between the baseline and intervention periods, based on participants 'self-control levels (low, average, and high) and intervention conditions (Reflection, Planning, and Waiting). Each vertical line indicates the magnitude of change in percentages, while adjacent labels report the estimated reduction. Predictions are based on a gamma-distributed mixed-effects model that includes self-control as a standardized moderator.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

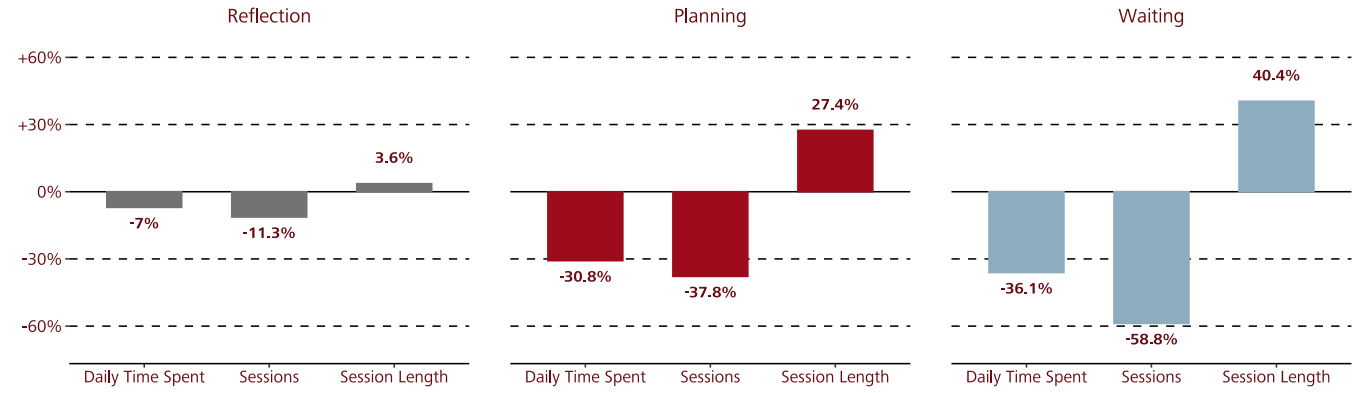
Planning and Waiting Create Similar Reductions through Different Means

Participants in the Planning and Waiting groups reduced their social media activity by roughly equal amounts, but through different means.

The Waiting intervention caused a very large drop in participants' social media sessions, with 59% fewer sessions compared to the baseline period. However, this decline was accompanied by a 40% increase in average session length, indicating that users opted for fewer but longer sessions after being exposed to a brief delay before being able to access their social media (cf. Figure 0.8).

Similarly, the Planning intervention reduced the number of sessions while increasing average session length, albeit the change to both parameters was less pronounced. Participants in this group accrued 38% fewer sessions relative to the baseline period, along with a 27% increase in session length (cf. Figure 0.8).

Figure 0.8 **Predicted Percentage Changes in Daily Activity, Session Frequency, and Session Length by Condition**



Note: This figure displays the model-predicted percentage change in three core behavioral outcomes—daily social media activity, number of sessions per day, and average session length—comparing the baseline and intervention periods across the three experimental conditions: Reflection (grey), Planning (dark red), and Waiting (blue).

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024

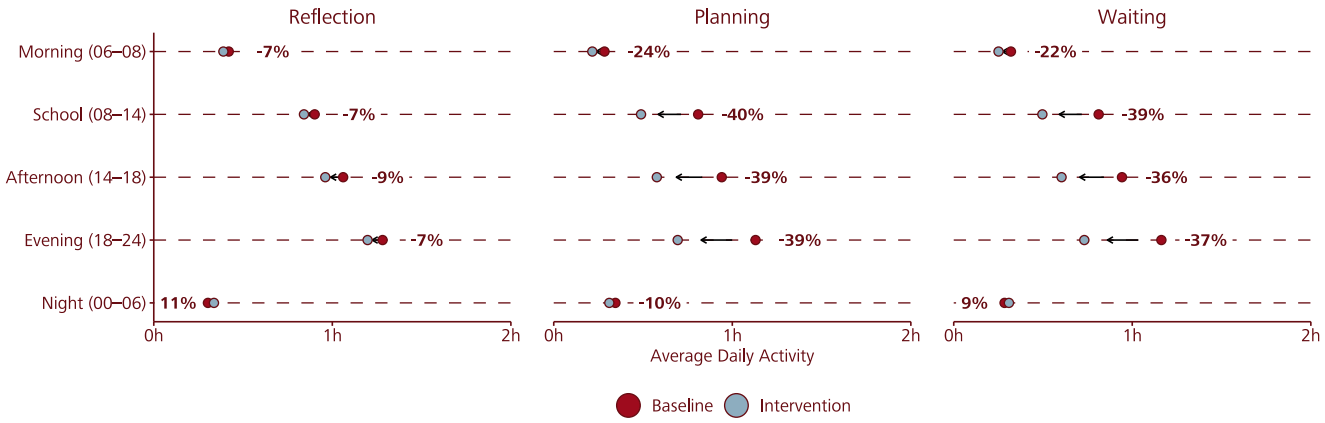
Intervention Effects Were Larger for TikTok and Snapchat
TikTok and Snapchat were the participants' most preferred social media platforms throughout the experiment; but they were also the most affected by the interventions.

During the Planning intervention, participants reduced their daily TikTok use by 44 minutes (39%) and Snapchat use by 27 minutes (37%). Similar reductions were noted for the Waiting intervention, in which the participants reduced their TikTok activity by 51 minutes (42%) and that of Snapchat by 28 minutes (40%).

The Interventions Reduce Social Media Usage During School- and Leisure Hours
The most significant drop in social media activity was during school hours (08:00–14:00 on weekdays), where participants in the Planning group and the Waiting group reduced their social media activity by 40% and 39%, respectively.

Substantial reductions were also noted in the afternoon (14:00–18:00) and during evenings (18:00-24:00) on weekdays. Participants in the Planning group and the Waiting group reduced their social media activity in the afternoon by 39% and 36% and nighttime activity by 39% and 37%, respectively. Figure 0.9 depicts the complete distribution of reductions across five time-windows: morning, school, afternoon, evening, and night.

Figure 0.9 **Change in Average Social Media Activity across the Time Windows by Intervention Condition**



Note: This figure illustrates participants' average social media activity across five designated time windows during the day: morning (06:00–08:00), school (08:00–14:00), afternoon (14:00–18:00), evening (18:00–24:00), and night (00:00–06:00). The x-axis shows the activity in minutes, and the y-axis lists the daily time windows. Each panel depicts one of the experimental conditions: Reflection (left), Planning (center), and Waiting (right). In each time window, red dots indicate participants' average social media activity during the baseline period, and blue dots represent it during the intervention period. Horizontal arrows indicate both the direction and magnitude of the change, with percentage reductions clearly labeled.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

Reduced Activity did not Affect Satisfaction with Social Media or Social Connectedness
Participants were queried before and after the experiment about their satisfaction with social media, social connectedness and a range of other topics. Their answers show that the significant reductions in social media activity across the intervention groups did not affect participants' professed level of satisfaction with social media. Other self-reported measures, including perceived control, social connectedness, well-being, and fear of missing out (FOMO), also remained unchanged between baseline and intervention periods.

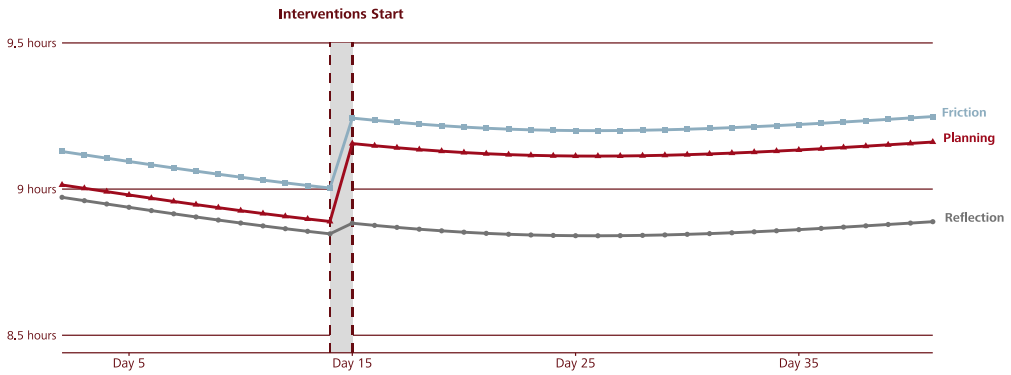
The only notable change was a slight decrease in perceived overuse for the Waiting group.

Strong Indications That Interventions Improved Participants' Sleep

The Planning and Waiting interventions increased participants potential sleep. This was estimated based on the gap between the time of a participant's last social media activity on one day and the first activity on the following day.

Participants in the Planning and Waiting group gained an average of 16 minutes and 30 seconds and 14 minutes and 48 seconds of additional minutes for sleep, respectively. This change occurred immediately after interventions activated and remained consistent throughout the entire intervention phase. Participants in the Reflection group showed no such change (Figure 0.10).

Figure 0.10 **Model-Predicted Potential Sleep Trajectories Based on the Intervention**



Note: The figure displays estimated daily sleep duration (in hours) over time for each intervention: Waiting (light blue), Planning (red), and Reflection (gray). The x-axis represents the day of participation in the experiment, with the transition from baseline to intervention, indicated by a vertical dashed line. Solid lines show predicted values from the model.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

Potential Limitations

The interventions remained effective throughout the four weeks of their implementation; however, this does not rule out the possibility that their effectiveness may change over longer periods.

The skewed gender distribution in the experiment is another limitation. Of the total participants aged 13–17 years. The interventions could affect other segments differently.

Finally, the experiment relied on voluntary participation, and although participants were incentivized to minimize selection bias and were comparable in terms of self-control and social media consumption and addiction, a possibility remains that the sample might be more receptive to the interventions.

Chapter 1
Young Consumers and Social Media

This study reports the results of an experiment conducted by the Danish Competition and Consumer Authority (DCCA) to assess the effects of behavioral interventions on the social media consumption of young consumers.

Social media has become an integral commodity for young consumers, as they spend a significant portion of each day scrolling through content and chatting with each other and with their family. In general, services of these social media platforms obtain no cost from consumers other than their time and attention that social media platforms utilize to generate data and sell advertisements.

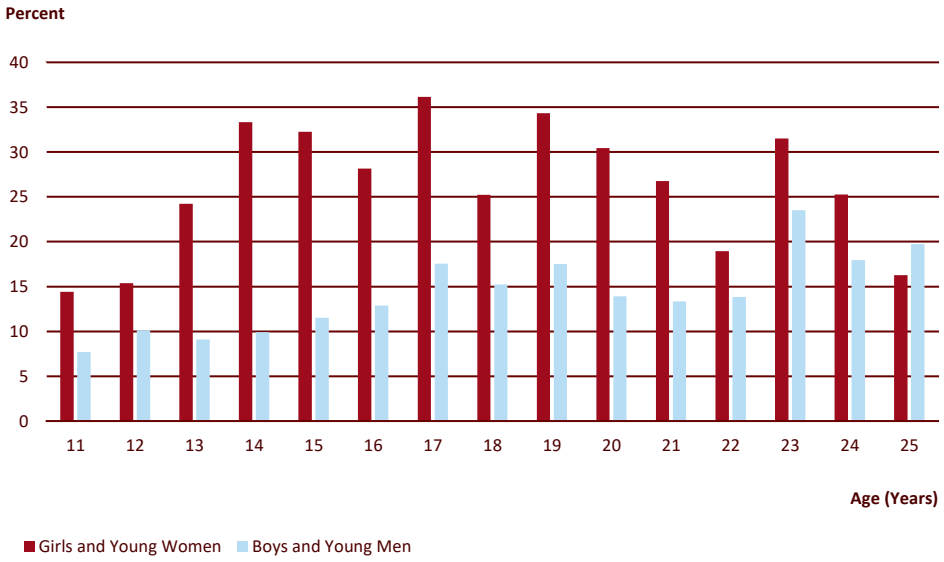
Although this business model offers many obvious benefits, its reliance on attracting and maintaining users' attention has raised several public concerns about its overuse and addiction, especially among young consumers.

The DCCA investigated this issue in 2025 and concluded that, although the level of social media consumption appears unrelated to general well-being, a significant inverse relationship exists between social media addiction and well-being.[3] The analysis outlined how young consumers with less self-control were more likely to exhibit addictive behaviors and tendency of social media overuse, and they were more likely to experience a decline in their overall well-being.[4]

The DCCA report also identified substantial disparities in social media usage between boys and girls, indicating that girls spend significantly more time on social media platforms than boys, especially during adolescence. Furthermore, girls demonstrate more addictive behaviors than boys (Figure 1.1), and seem to experience a decline in their overall well-being in school in the years after they acquire their first personal smartphone (Figure 1.2).

Figure 1.1 **Share of children and young people with Moderate to Severe Addiction**

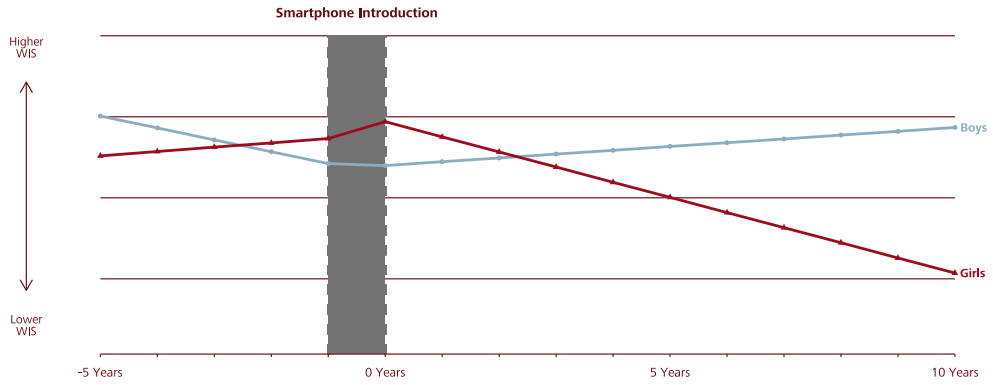
[3] Danish Competition and Consumer Authority (2025): Young Consumers and Social Media
[4] IBID



Note: The x-axis represents the age (in years) of young consumers' addiction scores (i.e., ≥18) that reflect moderate to severe addiction issues (Cheng et al. 2021). The y-axis represents the percentage of participants who reached this threshold. The red bars and blue bars denote female (n = 1460) male (n = 1321) participants, respectively.

Source: Danish Competition and Consumer Authority (2025): Young Consumers and Social Media

Figure 1.2 **Predicted Well-Being in School (WIS) Before and After Smartphone Introduction**



Note: The figure illustrates the predicted well-being of the participants in school (z-scored) as derived from the long-term exposure model associated with smartphone use. The x-axis shows the duration of smartphone exposure in years, where values less than zero indicate the pre-smartphone wellbeing in school. Values higher than zero indicated wellbeing in school after smartphone use begins. The y-axis represents the predicted well-being. The figure illustrates the trajectories of well-being for male participants in comparison to female participants, facilitating gender-based comparisons before and after smartphone acquisition.

Source: Danish Competition and Consumer Authority (2025): Young Consumers and Social Media

Social media platforms such as Instagram, TikTok, Snapchat have met these concerns with a variety of initiatives. In 2024, Instagram (Meta) introduced dedicated "teen accounts" incorporating features designed to limit the teenagers' exposure to harmful content and unsolicited

contact from strangers. Teen accounts also enabled users to set daily time-limit reminder notifications and increased parental supervision.[5] TikTok (Bytedance) implemented similar features in 2023 for teen users, such as age-dependent restrictions on who can view, comment on, and interact with content posted by younger users. It also enabled the users with daily time-limit reminders and wind-down features designed to reduce activity on TikTok after 22:00.[6]

The majority of these initiatives aimed to limit what users could see or do on social media platforms to reduce potential harm they caused; however, they did not explicitly aim at reducing user activity. In the rare instances when media platforms have implemented protective features specifically to reduce the activity of their teen users, such as TikTok's daily time-limit reminders, the actual effects on user behaviors appear to have been minimal.[7]

Concerns over social media's impact on young consumers' well-being have also led to several policy responses. In 2024, Australia enacted a law that explicitly banned users under 16 years of age from using most social media platforms (although it exempted YouTube).[8] The EU's Digital Services Act (DSA), which came into effect in 2024, mandates that social media platforms must enhance their moderation of harmful content and cyberbullying to limit teens' risk of harmful online experiences.[9] The UK adopted a similar approach with the Online Safety Act (OSA), which includes many provisions similar to those in the DSA.[10] Although content moderation is an essential tool for limiting users' exposure to harmful content or behaviors on social media, no research has been conducted on how this impacts users' overall activity.

Previous research has demonstrated that the use of social media use is highly driven by habits that, once established, can become rigid and resistant to change, even when the user truly wants it and actively tries to change it[11]. In addition, consumers tend to underestimate the size of their future social media consumption and overestimate their capability to regulate this. This may explain why many consumers fail to take appropriate measures for reducing their future consumption, such as enabling native or third-party smartphone features designed to restrict their social media consumption. Without such external interventions, consumers must monitor their own behaviors to limit excessive consumption, which demands a significant degree of self-control. This helps explain the strong association identified in previous research between low self-control and harmful outcomes related to social media, such as overuse and addictive behaviors.[12]

In addition, habitual consumption has significant implications for the social media market. Researchers estimate that self-control issues may account for as much as 31% of the total amount of time adults spend on social media, making habits an integral part of the market's business model and encouraging social media firms for continuing problematic habit formation among their consumers.[13]

[5] https://about.fb.com/news/2024/09/instagram-teen-accounts/

[6] https://newsroom.tiktok.com/en-us/new-ways-we-are-supporting-parents-and-helping-teens-build-balanced-digital-habits

[7] https://www.npr.org/2024/10/11/g-s1-27676/tiktok-redacted-documents-in-teen-safety-lawsuit-revealed

[8] https://www.infrastructure.gov.au/department/media/news/social-media-minimum-age-legislation-passed

[9] https://better-internet-for-kids.europa.eu/en/bik/digital-services-act

[10] https://www.legislation.gov.uk/ukpga/2023/50

[11] Allcott, Hunt, Matthew Gentzkow, and Lena Song (2022). Digital addiction.

[12] Danish Competition and Consumer Authority (2025): Young Consumers and Social Media,

[13] Allcott, Hunt, Matthew Gentzkow, and Song (2022). Digital addiction.

Chapter 2
Experimental Design

The rationale of this study lies in the fact that—due to the strong connection between habits, self-control, and harm (e.g., overuse and addiction)—interventions designed to target habitual consumption can serve as potential remedies.

To test this, the Danish Competition and Consumer Authority (DCCA) conducted a six-week randomized field experiment with 269 young Danish social media users to measure their social media activity and assess how it is affected by interventions designed to disrupt habitual consumption.

2.1 Data Collection

For this study, data were collected using an adapted version of the one sec application (Box **2.1**) that was specifically developed for this experiment and installed on participants' smartphones for the duration of the study. The experiment was conducted in collaboration with Dr. David Grüning from Stanford University and the Max Plank Institute and Frederik Riedel, who had developed the one sec app. Though this app was chosen as the research partner for this project (Box **2.1**), it is one out of several self-help apps designed to help consumers restrict or control their social media consumption.[14]

Participants were instructed to link one sec to all content-focused[15] social media apps on their smartphones using automated shortcuts.[16] This step enabled one sec to track their social media activity through timestamps[17] that helped calculating the primary measures for the analysis, namely daily activity (i.e., the time spent on social media), sessions (i.e., unique requests to open a social media platform), and session length. Box **2.2** provides a detailed description of these constructs.

[14] See for instance "The REDD project" by Dr. Ulrik Lyngs, which contains an overview of the tools available to consumers and organizations to reduce digital distractions: https://www.redd-project.org/#research-section

[15] Social media apps primarily fall into two types, chat-based and content-based (Danish Competition and Consumer Authority (2025): Young Consumers and Social Media, page: 21). In this study focus on content-based social media.

[16] Though participants were instructed to connect the app to all their content-based social media apps, it could not be verified whether some participants left out certain apps. Before the experiment participants provided a list of social media apps they used on their phones, which served as a participant specific guide for apps they should connect.

[17] One sec had no access to what participants did or saw on their social media.

Box 2.1
The Application, one sec

Developed in 2020, one sec is a self-help app to increase user awareness of how, when and why they consume social media while providing them tools to actively minimize their social media addiction.

A small, independent team led by developer and founder Frederik Riedel runs one sec—a self-financed app. Users who wish to use one sec for more than one target apps can purchase its pro version. User data is not shared with third parties for profits.

Collaboration
The DCCA and one sec collaborated to investigate young consumers' use of social media and the effects of interventions on social media consumption within a sample of young consumers. A beta-version of the app was designed to align with the experiment's research design, data collection, and data sharing with the DCCA, which recruited participants and facilitated the analysis.

Read more about one sec here: https://one-sec.app/about/

Box 2.2
Social Media Consumption Measures

To analyze social media consumption, the following three variables were constructed based on time stamp data:

1. **Activity**: Total time spent (in minutes) daily across all social media platforms from opening to closing the app, which was tracked individually per app (e.g., daily time spent on TikTok) and then aggregated.

2. **Sessions**: Social media visits calculated per day within apps (i.e., keeping a log of every app-opening instance for individual (e.g., Snapchat) and all apps.

3. **Session duration**: A participant's time spent on average from opening to closing a social media app.

Activity and sessions were reported both as fixed and rolling averages for each day in the experiment for a precise analysis of the effects over time. [18]

2.2 Data Collection of Psychometrics and Attitudes

Participants were asked to fill out two surveys as part of the experiment. The first was completed before the experiment was started, and the second was completed after it ended. Both

[18] Rolling averages method calculated a new average for each new point in time in the analysis (e.g. day) based on data from the current and previous day, resulting in updated means over time as the experiment unfolds. This approach is a less noisy method to illustrate average development over time.

surveys included psychometric tests[19] along with the participants' attitudes and experiences related to social media consumption.

Survey data was used to analyze potential changes in respondents' overall assessment of social media and to identify potential unintended consequences of the intervention beyond its direct effects on the participants' social media activity. Please refer to the technical appendix section 1[20] for the complete details about the survey and scores.

2.3 Intervention Design

Habitual consumption is characterized by repeating patterns of unconscious consumption triggered by contextual cues.[21] While the consumption may originally have been entirely motivated by choices, as habits start forming over time, consumers lose a degree of control over when and how much they engage. However, consumption is very rarely entirely habitual, and a consumer's daily use of social media likely includes instances in which they can actively decide to engage with a social media platform or find themselves looking at their phone for no particular reason.

Interventions may help restore some degree of control over habitual consumption. One way is making changes to the environment of consumption, e.g., hiding the product from sight to reduce the salience of cues linked to the habitual response. Another way is creating gaps between cues and potential responses, to allow consumers to better reflect on their actual preferences at that given moment. This project focused on the following three interventions: *reflection-*, *planning-*, and *waiting*-based interventions.

Reflection interventions aim to make consumers acutely aware of their motivations behind consuming a certain product, typically by asking them to provide explicit justification at the time of consumption. Such interventions can change the consumers perspective on the consumption and make them more aware of their motivations, and thus better regulate their present and future consumption.[22] *Planning interventions* work by urging consumers to plan their future consumption by allowing them to set predefined limits on their consumption so that when a certain threshold is reached, they can be notified.[23] As a consequence, this intervention can either cut off access to social media in entirety or impose some cost to further consumption. *Waiting interventions* work by strategically embedding enough friction into the consumption process by delaying access, which enable consumers to better evaluate their preferences of consumption.[24]

Participants were randomly assigned to one of the following experimental groups:

[19] Psychometric tests are objective assessments used to evaluate individual characteristics like personality, aptitudes, and abilities

[20] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

[21] Wood, Wendy, and David T. Neal (2009). The habitual consumer.

[22] Duckworth, Angela L., Katherine L. Milkman, and David Laibson (2018). Beyond willpower: Strategies for reducing failures of self-control.

[23] Duckworth, Angela L., Katherine L. Milkman, and David Laibson (2018). Beyond willpower: Strategies for reducing failures of self-control.

[24] Duckworth, Angela L., Katherine L. Milkman, and David Laibson (2018). Beyond willpower: Strategies for reducing failures of self-control.

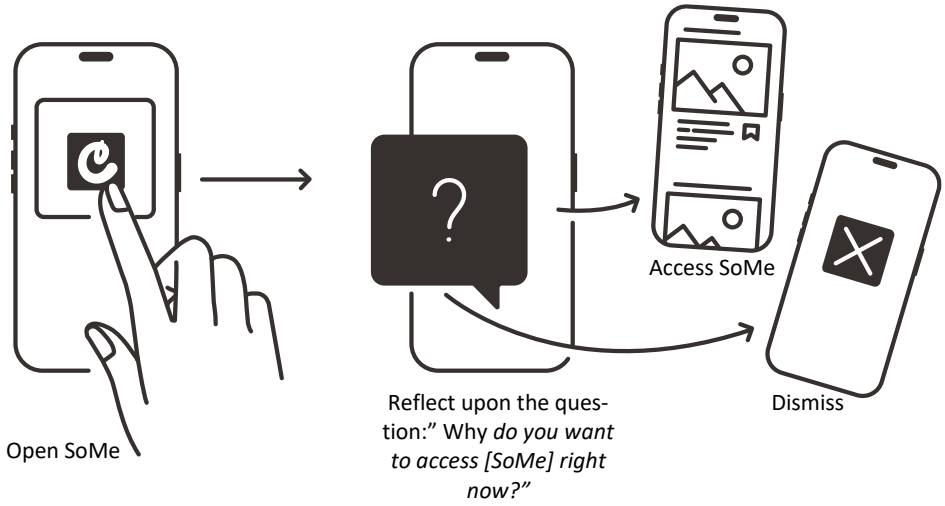
The Reflection Group
On every fifth session, participants were given the following two reflection questions to answer before they could access the app:

1. **Intention question:** Why do you want to access [the social media app] right now?
2. **Emotion question:** How are you feeling right now?

In response to the intention question, participants could select from 13 possible intentions. In response to the emotion question, participants could select one of 12 emotional states by tapping on it (see the technical appendix section 2, Figure 2A for the design).[25]

Participants could also choose to dismiss the question; however, doing so dismissed the opportunity for social media engagement. Figure 2.1 illustrates the action flow for the Reflection group.

Figure 2.1 **Flow for the Reflection Group**



Note: The illustration shows what participants in the reflection group encountered every fifth time they opened a social media app. When a participant tapped to open an app, they were met with two questions: *"Why do you want to access [SoMe] right now?" and "How are you feeling at that moment?"*

For each question, the participant could either respond by selecting an appropriate icon among 13 possible intentions and 12 possible emotions or opt out of the session and dismiss opening social media. If the participant answered the questions, they gained access to the social media platform. If not, the app was closed instead.

Source: Danish Competition and Consumer Authority. 2025

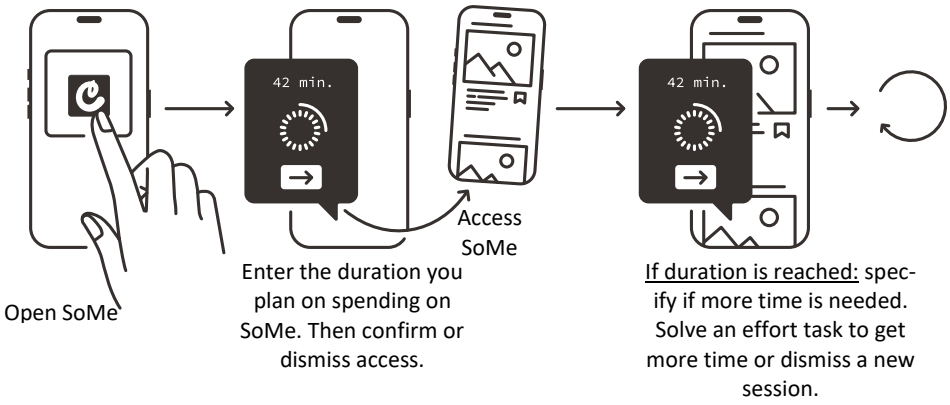
The Planning Group
For each social media session, participants were asked to specify how long they planned to use the media. This was achieved by adjusting a slider on a speedometer-like scale, which had a

[25] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

maximum session length of 45 minutes. They were then asked to either confirm their access to the app or dismiss the session. If a participant reached their time limit, they were reminded and asked whether they needed additional time or wished to end the session. To encourage realistic estimates, participants were asked to perform a minor effort task after which they encountered a new intervention and planning prompt (reintervention). This effort task could involve waiting for 6 seconds, tracing a random pattern on the screen with a finger, or writing random text.

Figure 2.2 illustrates the action flow for the Planning Group, while the technical appendix section 2 (Figure 2B) provides pictures of the actual decision made by the Planning group.[26]

Figure 2.2 **Flow for The Planning Group**



Note: The illustration shows what participants in the planning group were exposed to each time they opened a social media app. When a participant tapped on a social media app to open it, they were met with a screen where they had to specify how much time they wanted to spend on that platform. The default setting was 1 minute, with a maximum of 45 minutes.

The participant then had to confirm whether they wanted to proceed to the app or dismiss and close it. If they confirmed they were granted immediate access to the social media platform. If they dismissed, the app was closed instead.

If the participant reached their set time limit on the app, they received a reminder that their time was up. They could then choose whether they needed more time or wanted to close the app. If they wished to continue using the social media platform, they had to complete a small effort task and then set a new time goal for the extended app use.

Source: Danish Competition and Consumer Authority. 2025

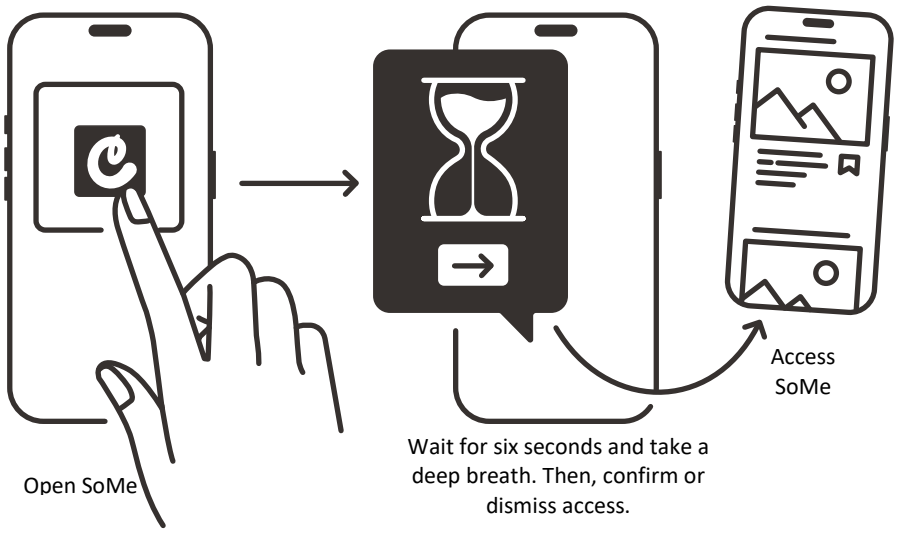
The Waiting Group

For each session, an animation prompted participants to take a deep breath and compelled them to wait for 6 seconds. They were then asked whether they still wanted to access the app or dismiss opening it. Figure 2.3 illustrates the action flow for the Waiting group. The technical appendix section 2 (Figure 2C) displays a picture of the actual decision screen for the Waiting group.[27]

[26] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

[27] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

Figure 2.3 **Flow for the Waiting Group**



Note: The illustration shows what participants in the waiting group encountered each time they opened a social media app. When a participant tapped to open an app, they were met with an animation that forced them to wait six seconds before gaining access to the platform.

The participant then had to confirm whether they wanted to proceed or dismiss the app opening. If they dismissed, the app was closed.

Source: Danish Competition and Consumer Authority. 2025

If participants exited a social media app but came back within 60 seconds, their return did not initiate a new intervention.

Although the interventions depended on various cognitive mechanisms, they all added varying degrees of friction to the process of accessing social media.

Requiring participants to periodically reflect on their activities introduces a slight friction to the app-opening process; however, it can be managed with minimal extra effort. The planning intervention introduces additional friction and necessitates more effort, as users must specify a time limit for each app-opening instance and confirm their desire to access the platform via an extra tab. Finally, the waiting intervention introduces the greatest degree of friction by delaying access to the platform and requiring users to wait. Therefore, the effects of the individual interventions can be attributed to both the varying levels of friction and the additional mechanisms within the intervention design.

2.4 Participants and Recruitment

Danish social media consumers age 13–17 years with iPhones were eligible to participate in the experiment. The iPhone requirement was essential because randomization necessitated

participants to use the same operating system on their phones. Approximately 80% of Danish teenagers use iPhones.[28]

Initially, 400 participants were recruited for the study, of which 312 successfully installed the one sec app with the necessary shortcuts and automations to ensure the setup works properly. However, 43 participants were excluded from the study due to technical errors,[29] leaving a final sample of 269 participants with valid data.

All participants completed the pre-experimental survey and 208 participants completed the follow-up survey. The final sample was skewed more towards girls, who made up 70% and it had slightly more very young participants with 13-year olds making up 29%. Box **2.3** presents the sample's demographic characteristics.

As participation was voluntary, participants could choose to opt out during the course of the experiment, which is often referred to as attrition. In general, the study had low rates of attrition (8.2%) and it was evenly distributed within the three experimental groups, which indicates that participants were not more likely to exit the experiment due to being exposed to one specific intervention. The technical appendix section 3 provides more details about attrition rates.[30]

The analytical dataset on participants' activity (number and length of sessions) applied stricter inclusion criteria, because participants had to have at least one valid session open and one valid session close event during both the baseline and intervention periods. As a result, the sample for this part of the analysis reduced to 243 participants.

Experiments and studies often experience selection bias, where certain individuals in the population are more likely to sign up or respond to recruitment notices than others. Incentives were implemented to address selection bias and attract as diverse group of participants as possible.

Incentives: participants received a 400 DKK (€54) value gift card from a universal gift card vendor[31] upon completing the entire study. In addition to gift cards, participants were given access to the pro version of one sec, worth approximately €30, after the experiment.

Recruitment Strategy

Participants were recruited through the online panel company Norstat A/S and advertisement notices sent to 1,981 public and municipal schools (Folkeskoler and Efterskoler) in Denmark, which could be shared with students online or in classrooms. However, schools were not required to share the invitation with students. Students under the age of 15 were required to obtain additional consent from parents or guardians. Regardless of the channel, Norstat managed all recruitment, consent, and gift-card issuance.

[28] Young Consumers and Social Media, 2025, Danish Competition and Consumer Authority

[29] Specifically, 22 participants did not interact with any of the selected apps during the relevant study periods (baseline or intervention), 9 participants lacked data from the intervention period, 6 participants had no valid assignment to an intervention condition, 5 participants began the intervention phase later than day 24,1 participant did not open any selected app in both the baseline and intervention periods. These filters resulted in a final analytic sample of 269 participants with valid and interpretable behavioral data.

[30] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

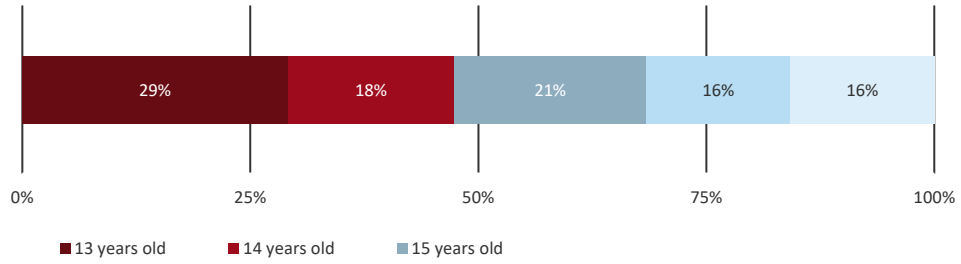
[31] The gift cards were issued to GoGift, Supergavekortet.dk, a Danish vendor of universal gift cards. The gift card could be redeemed at a wide variety of retailers, both online and in physical stores and could be used for multiple purposes.

A website was created for parents and participants that contained information about the study, data and contact details. In addition, the DCCA offered a hotline for technical support and inquiries throughout the study period. Participants were geographically distributed in line with the general population.

Box 2.3
Sample Demographics

Sample size: 269 individuals Boys: 30 percent Girls: 70 percent

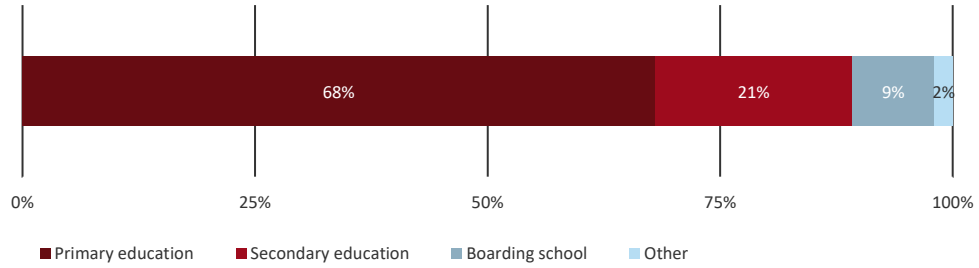
Figur 2.4 **Age distribution of participants in the experiment (in percent)**



Note: The figure shows the distribution of participants according to age in percentage of the sample.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

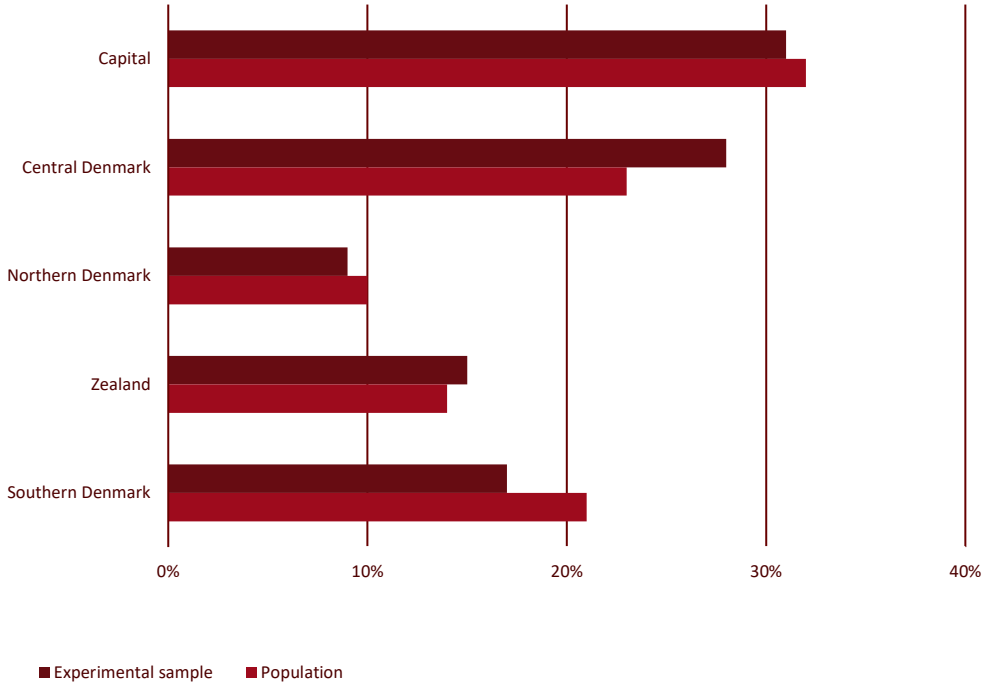
Figur 2.5 **Grade level distribution of participants in the experiment (in percent)**



Note: The figure shows the distribution of participants according to education in percentage of the sample.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

Figur 2.6 **Grade level distribution of participants in the experiment (in percent)**



Note: The figure shows the regional distribution of participants in the sample relative to the population in percentage.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

2.5 Experimental Design

The experiment was conducted in the following two consecutive phases:

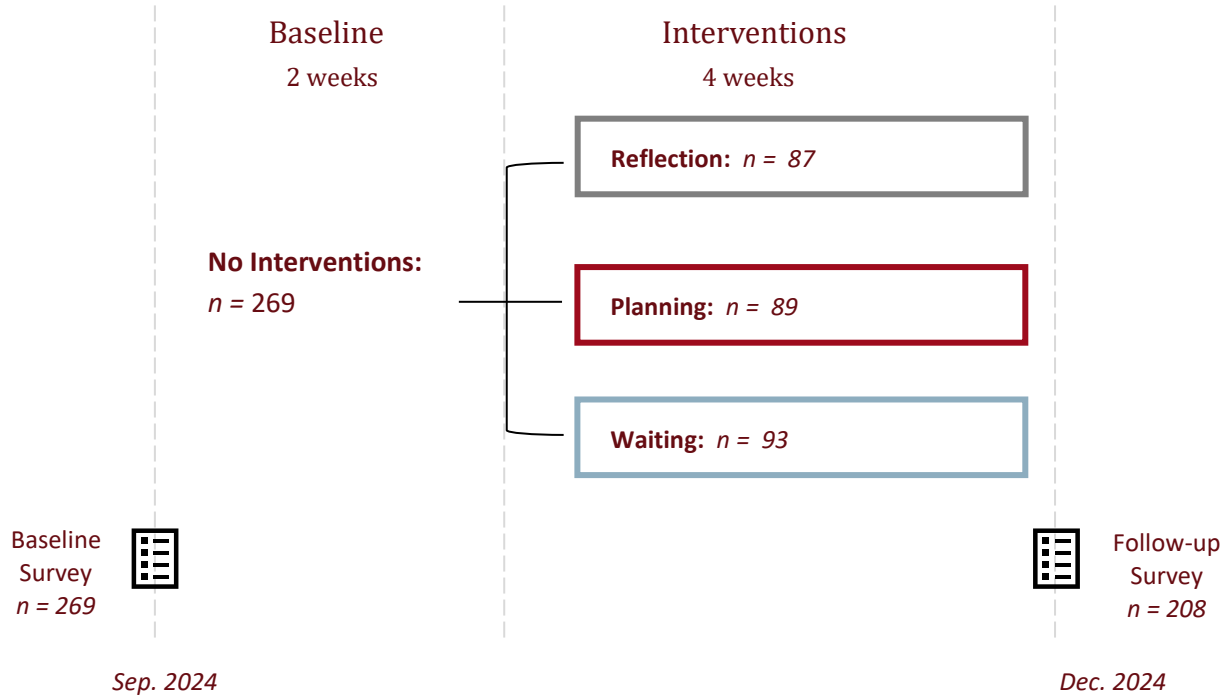
1. A two-week baseline observational phase.
2. A four-week intervention phase with three intervention arms.

In the *baseline phase* participants' normal use of social media was logged. This data provided a detailed outline of the segment's social media consumption and served as a reference point for any potential intervention effects.

Data from the *intervention phase* was used to evaluate the interventions' effect on the participants' social media consumption compared to those in the baseline across the three groups. This phase continued for four weeks to capture both immediate and longer-term effects to check their consistency over time.

Figure 2.7 provides an overview of the study design and group demographics are specified in the technical appendix section 4.[32]

Figure 2.7 **The Experimental Study Design**



Note: The figure illustrates the experimental study design over time. The study started with a pre-experimental baseline survey followed by a two-week baseline period, where no interventions were active and regular social media consumption was recorded. After the two-week baseline period a four-week intervention period followed, where participants were randomly assigned to one of three experimental groups, the reflection group; the planning group or the waiting group, with each their interventions activated. After the four-week intervention period participants filled out a post-experimental follow-up survey. The experiment ran from sepetmber 2024 to December 2024. Participants were recruited and enrolled into the experiment throughout September and October.

Source: The Danish Competition and Consumer Authority. 2025

[32] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

Chapter 3
Young Consumers' Use of Social Media—the Baseline Period

3.1 Chapter summary

Data from the baseline period provided detailed insights into young consumers' use of different social media platforms.

The four main results include the following:

» **TikTok and Snapchat Dominates**
In terms of time spent, TikTok accounted for the largest share of activity, with participants spending an average of 126 minutes per day on the platform. It also had the longest sessions, lasting 5 minutes and 48seconds on average. Snapchat was the most accessed app, with a median of 25 sessions per day, indicating quick and repeated interactions. Instagram ranked third in terms of activity but was used less intensively per session.

» **Age and Context Affect Consumption**
Older participants and secondary education students used social media more frequently and for longer durations. Participants who were aged 17 years spent an average of 254 minutes per day on social media, with a median of 82 sessions per day—over twice that those of participants aged 13 years. Participants in secondary education spent an average of 260 minutes per day, while those in primary school spent an average of 180 minutes.

» **Frequent Use of Social Media During School Hours**
On weekdays between 8:00 and 14:00, defined as school hours, primary school participants spent an average of 40 minutes (11% of the school day) on social media. For students in secondary education, this figure increased to 77 minutes (21% of the school day).

» **Clear Daily Patterns and High Social Media Activity during Weekdays and Weeken**
Social media activity followed a consistent daily pattern, starting early in the morning, continuing throughout the day, and peaking between 15:00 and 22:00 before dropping off sharply at night. On weekdays between 07:00 and 23:00, participants spent an average of 3 hours on social media—equivalent to 18.8% of this period, and 20.7% on weekends, between 09:00 and 01:00. The social media activity peaked on Saturdays, when more than 76% of participants were active during the busiest hours.

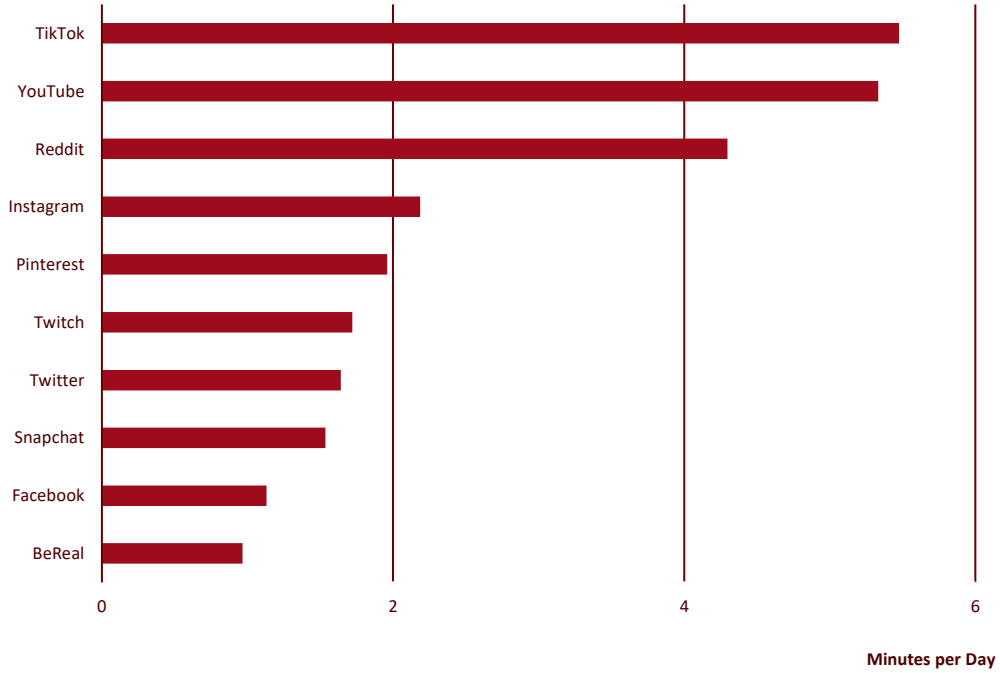
3.2 Young Consumers Use of Social Media

During the baseline period, participants spent an average of 3 hours and 19 minutes (199 minutes) per day on social media. Most of this time was spent on TikTok and Snapchat, with daily averages of 126 and 77 minutes, respectively.

Other platforms had less engagement. Instagram and YouTube accounted for 40 and 38 minutes per day, respectively, while Reddit, Pinterest, Facebook, and Twitter each attracted between 8 and 13 minutes. BeReal and Twitch were used the least, with daily average of under 7 minutes.

These averages are illustrated in Figure 3.1. As shown, TikTok accounted for a larger portion of daily usage than all other platforms, underscoring its dominant role in adolescents' social media routines.

Figure 3.1 **Average Daily Activity on the Individual Social Media Platforms in the Baseline Period**



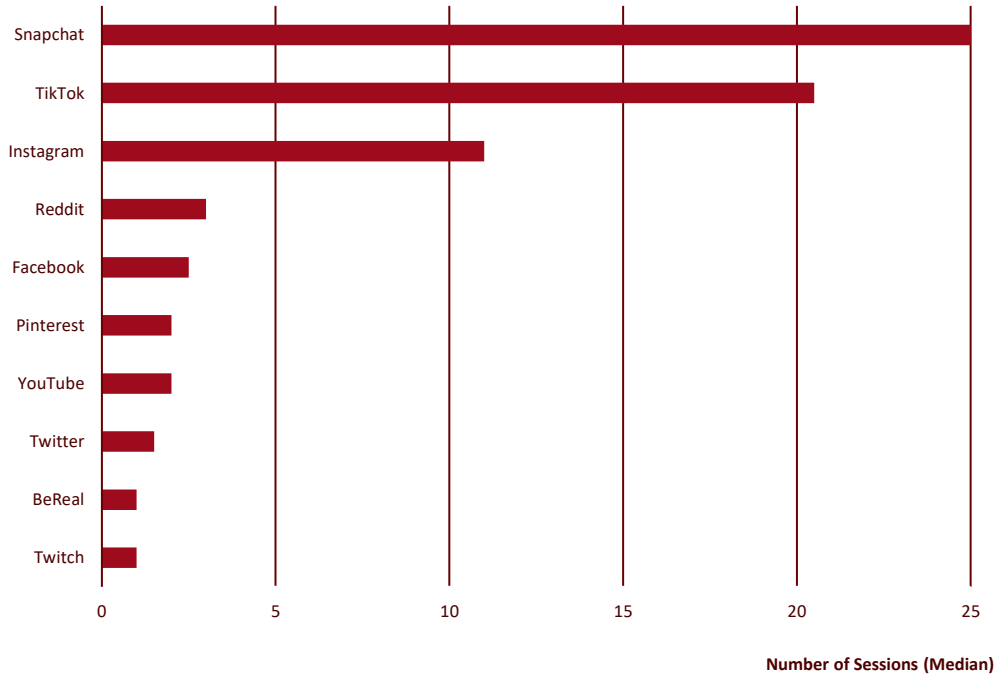
Note: The figure shows how much time the participants spend on average on each of the 10 most popular platforms in minutes per day in the baseline period.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

These behavioral patterns reflect participants' stated preferences. When asked to name their favorite social media platform, 43% of the participants chose TikTok, while 35% chose Snapchat. Instagram was the third most preferred platform, chosen by 13% of participants. These preferences remained consistent throughout the study period.

Participants engaged in a median of 50 social media sessions per day across all platforms (see Figure 3.2). Snapchat was the most frequently used platform, with a median of 25 sessions daily, followed by TikTok at 20.5 and Instagram at 11. Access to other platforms was lower. Reddit had a median of 3 sessions per day, whereas Facebook (2.5), Pinterest (2), and YouTube (2) had fewer sessions. Twitter (1.5), BeReal (1), and Twitch (1) were the least used platforms. These patterns indicate that Snapchat and TikTok are central to participants' daily routines than other platforms.

Figure 3.2 **Median Daily Number of Sessions on the Individual Social Media Platforms in the Baseline Period**



Note: The figure shows the median number of sessions the participants have on the ten most popular social media platforms in the baseline period.

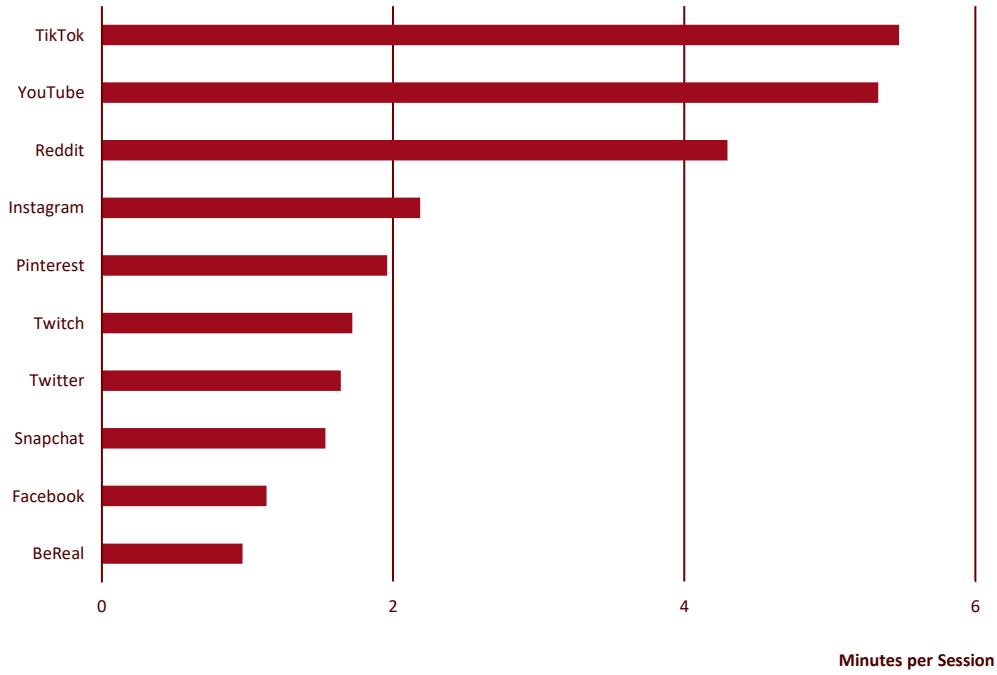
Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

Across all platforms, an average session lasted 3m42s (see Figure 3.3). TikTok and YouTube recorded the longest average session durations at 5 minutes 48 seconds and 5minutes 40seconds, respectively, indicating that users maintained sustained attention when they engaged with these apps. Reddit's sessions were 3minutes and 17seconds on average.

Instagram and Twitter sessions averaged slightly over 2 minutes, whereas Pinterest and Twitch sessions were around 1 minute and 42 seconds–1 minute 54 seconds each. Snapchat stood out for its brevity, with sessions averaging 1 minute and 40 seconds despite being one of the most frequently accessed apps.

BeReal and Facebook showed the shortest session durations, with users spending 1 minute 16 seconds and 1 minute and 11 seconds per visit on average, respectively. These differences highlighted the diverse roles platforms play in adolescents' routines, ranging from quick check-ins to more immersive browsing experiences.

Figure 3.3 **Average Session Length for the Individual Social Media Platforms in the Baseline Period**



Note: The figure shows the average length of a session on the ten most popular social media platforms in the baseline period.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

3.3 Group Differences in Social Media Usage

Breaking down activity patterns on the basis of groups demonstrates how social media behavior varies with context and age. Students in secondary education (*Danish*: gymnasium) had the highest usage frequency, with a median of 75 sessions per day, closely followed by boarding school (*Danish*: efterskole) students at 73 sessions. Primary school (Danish: *grundskole*) students were less active, with a median of 41 sessions per day, whereas other participants did not enroll in any of the three main school categories and —had a median of 36 sessions.

A similar age-related trend was observed, with older participants using social media more frequently. Social media apps most often used by those aged 17 years, with a median of 82 sessions per day. This was followed by those aged 16 (57), 15 (53), 14 (49), and 13 (34.5) years. These patterns indicated how the use of social media changes as adolescents age and move into higher levels of education.

The total time spent on social media showed a similar trend. Students in secondary education spent the most time on social media, with an average of 260 minutes per day. This was followed by the "Other" group, which averaged 199 minutes, and boarding school students, who averaged 195 minutes. Primary education students spent the least time on social media, with an average of 180 minutes (3 hours) daily. Among age groups, those aged 17 years had the highest daily usage at 254 minutes, followed by those aged 14 (221 mins), 16 (190 mins), 15 (179 mins), and 13 (174 mins) years.

However, session length demonstrated the opposite pattern. Thirteen-year-olds had the longest average session duration at 4 minutes and 55 seconds, which steadily declined with age to 2 minutes and 56 seconds for participants aged 17 years. By school type, primary education students had the longest sessions (3minutes and 59 seconds), followed by the "Other" group (3 minutes and 13 seconds), secondary education students (3 minutes and 8 seconds), and

boarding school students (2 minutes and 17 seconds). These results indicated that younger users tend to have fewer but longer sessions, whereas older adolescents engage with social media more often but in shorter intervals.

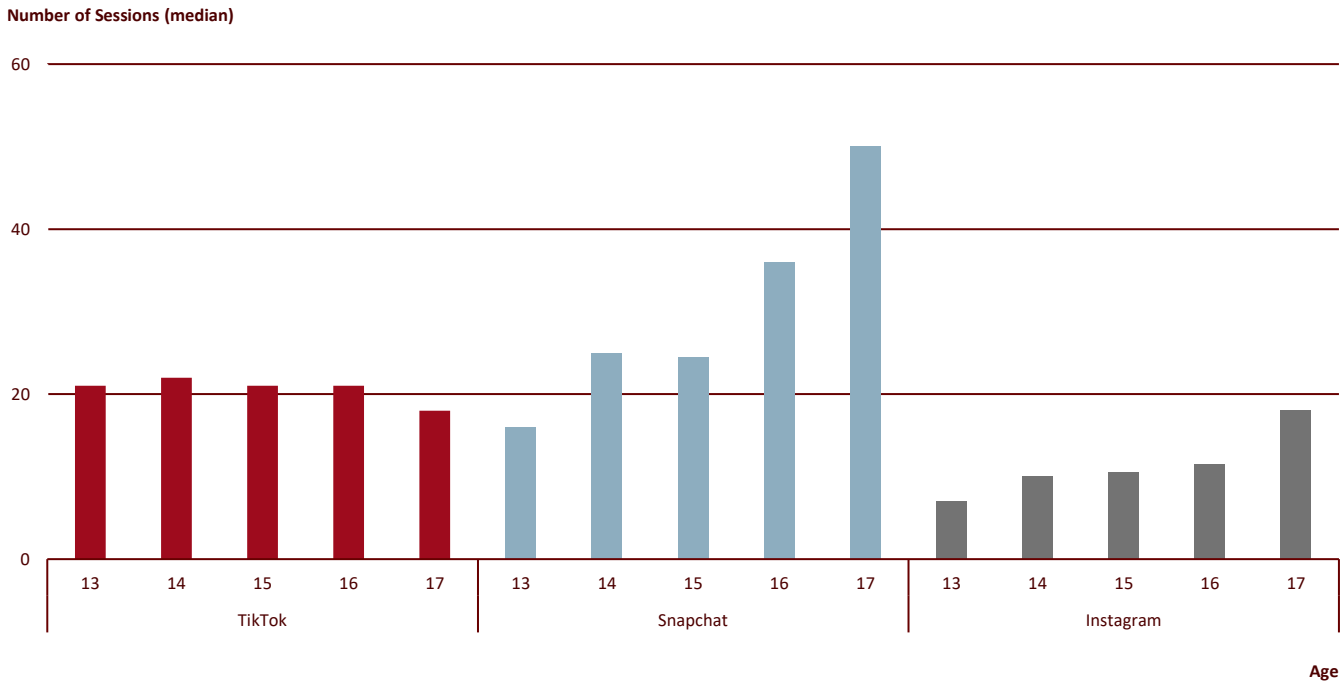
Social media preferences also exhibited distinct patterns related to age and education. TikTok was the leading platform among younger participants, whereas Snapchat and Instagram usage increased with age cf. (Figure 3.4 and Figure 3.5).

Among participants aged 13 and 14 years, TikTok had the highest level of activity in terms of frequency and duration. Thirteen-year-olds spent an average of 142 minutes per day on TikTok, increasing to 161 minutes at age 14—the highest among all age groups. Daily TikTok sessions peaked at age 14, with a median of 22 sessions, before gradually declining to 18 sessions and 108 minutes of usage by age 17.

In contrast, older participants used Snapchat and Instagram more heavily. Snapchat usage increased consistently from 52 minutes per day at age 13 to 132 minutes by age 17, while session counts grew from 16 to 50 per day. Instagram displayed a similar age gradient: participants aged 13 years accessed the app a median of 7 times per day, while those aged 17 years opened it for an average of 18 sessions daily. Average daily time increased from 40 to 49 minutes over the same period.

These age-related differences indicated a developmental shift in platform preferences. Younger users tend to engage most intensively with TikTok, whereas older users increasingly turn to platforms that focus more on messaging and stories, such as Snapchat and Instagram.

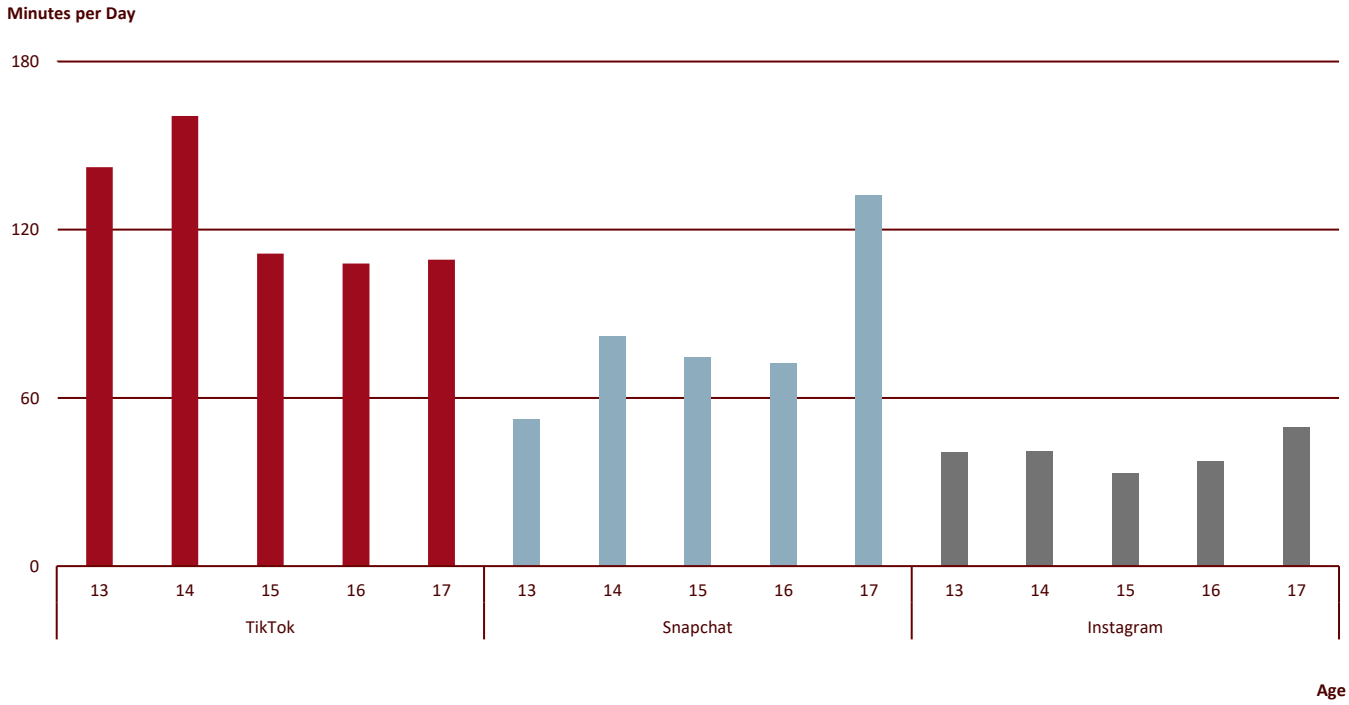
Figure 3.4 **Median Daily Number of Sessions for Instagram, Snapchat, and TikTok Based on Age Group**



Note.: The figure shows the median number of sessions on each social media platform across five age groups. Each panel represents one platform, with vertical bars indicating daily sessions by age. Snapchat is the most frequently accessed app, with usage rising notably with age. TikTok displays relatively consistent engagement across age groups, while Instagram shows a modest age-related increase in daily sessions.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 3.5 **Average Daily Social Media Activity on Instagram, Snapchat, and TikTok Based on Age Group**



Note: The figure displays average daily activity (in minutes) on Instagram, Snapchat, and TikTok across five age groups. Each panel corresponds to one platform, with vertical bars representing average activity by age. TikTok shows consistently high engagement across all ages. Snapchat usage increases with age, while Instagram exhibits lower and more stable usage levels.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

3.4 Daily and Weekly Patterns of Social Media Activity

Social media activity was detected during every hour of each day throughout the two-week baseline period, showing that at least one participant accessed a social media app during each one-hour window (Figure 3.6). However, nighttime activities remained limited. On weekdays, activity was minimal between 23:00 and 06:00. During weekends, this low-activity period shifted slightly, with app usage extending until around midnight or 01:00 and resuming later in the morning, typically around 10:00.

The overall activity peaked on Saturdays at 17:00, when 76.6% of participants opened at least one social media app (Figure 3.6)[33]. Saturdays were characterized by widespread and continuous engagement during all waking hours, suggesting constant use throughout the day. Figure

[33] This metric captures the share of participant–hour intervals in which at least one social media app was opened, relative to the total number of intervals during which those participants could have been active. It reflects how commonly users engaged with social media at each time point.

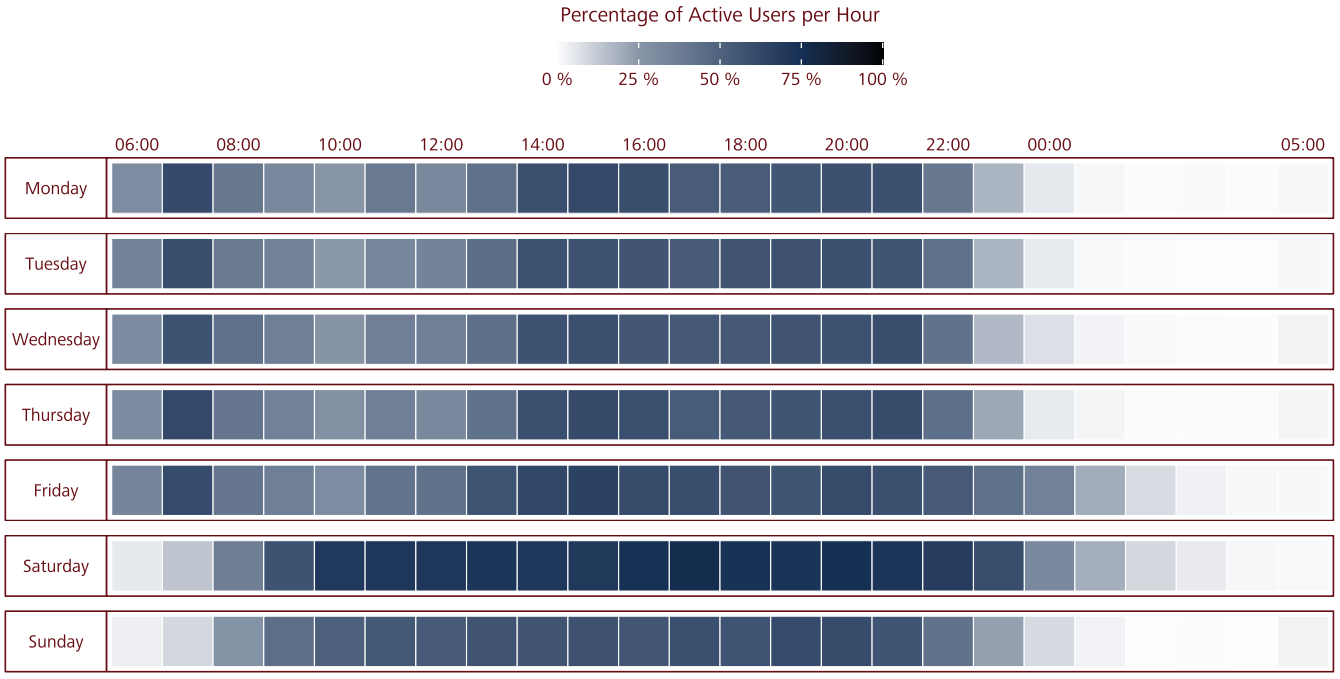
3.6 further illustrates this rhythm by showing the percentage of active participants for each hour throughout the week. Darker shades represent periods when a greater proportion of the sample initiated social media sessions.

On weekdays, social media activity typically started between 06:00 and 07:00 and increased throughout the morning. During school hours, defined as 08:00 to 14:00, activity levels were lower with the proportion of active users at any given hour varied from 24.8% (e.g., Tuesday at 10:00) to 62.9% (Friday at 14:00), indicating that although school schedules limit online activities, social media continues to be a regular part of students' routines, even during instructional periods.

During weekday school hours (08:00–14:00), participants spent an average of 52 minutes on social media—equivalent to 14.5% of the school day. As shown in Figure 3.7, usage peaked in the afternoon (14:00–18:00), when one in four hours (25%) was spent on social media. 21% of the evening hours (18:00–24:00) was spent on social media while morning (06:00–08:00) and late-night (00:00–06:00) activity remained lower at 17% and 5%, respectively.

The technical appendix section 5 provides supplementary analyses with alternative metrics, including the number of instances an app was opened and total time spent on it, which confirm similar temporal engagement patterns across the week.[34]

Figure 3.6 **Hourly Social Media Activity Based on Day of Week during the Baseline Period**

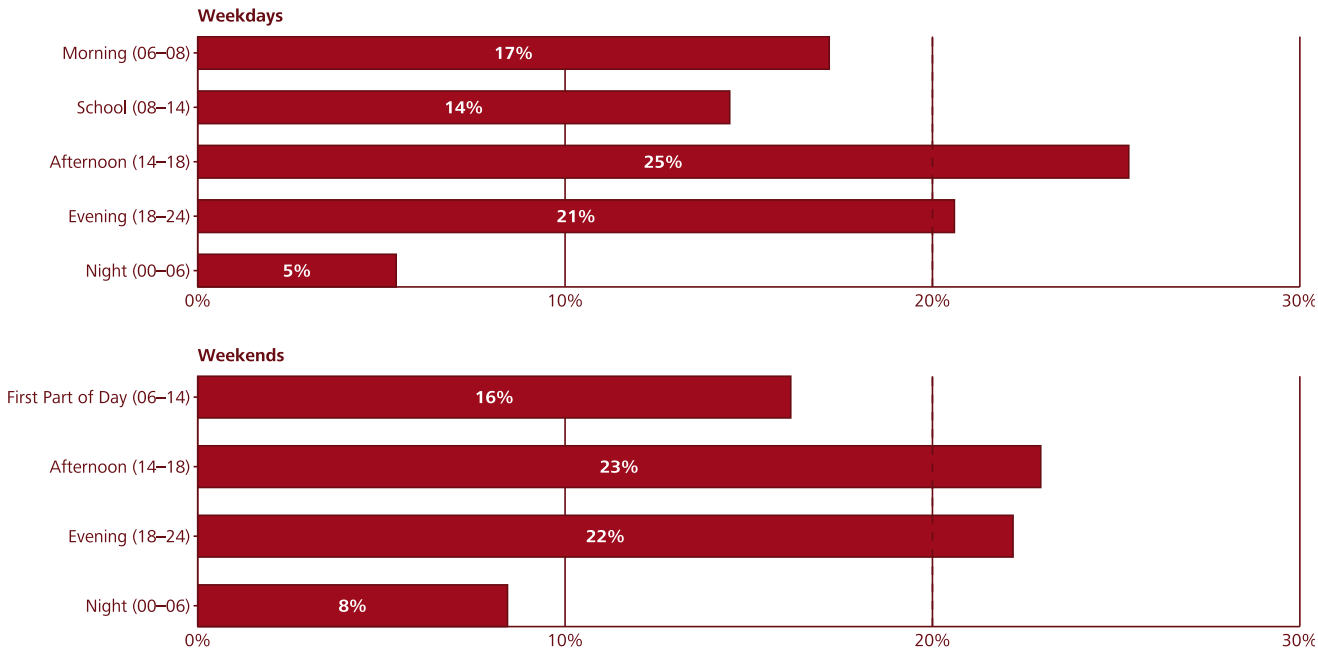


[34] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

Note: Each tile represents a one-hour time window on a specific day of the week. The shading reflects the share of users who opened a social media app during that hour, out of all users who could have been active at that time. White means no activity; dark green means everyone was active. Data from the Fall and Christmas breaks were excluded

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 3.7 **Proportion of Social Media Activity During the Day (Weekdays vs. Weekends)**



Note: Bars indicate the proportion of time that participants spent on social media during specified time windows. Weekdays were divided into morning (06:00–08:00), school (08:00–14:00), afternoon (14:00–18:00), evening (18:00–24:00), and night (00:00–06:00). On weekends, morning and school periods were combined into "first part of day (06:00–14:00),", followed by the afternoon, evening, and night. Dark red segments represent the time spent on social media compared to the total available time in each window. Averages excluded the first day of usage in each period and all observations during Fall and Christmas breaks.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

3.5 Social Media Activity Based on Educational Level

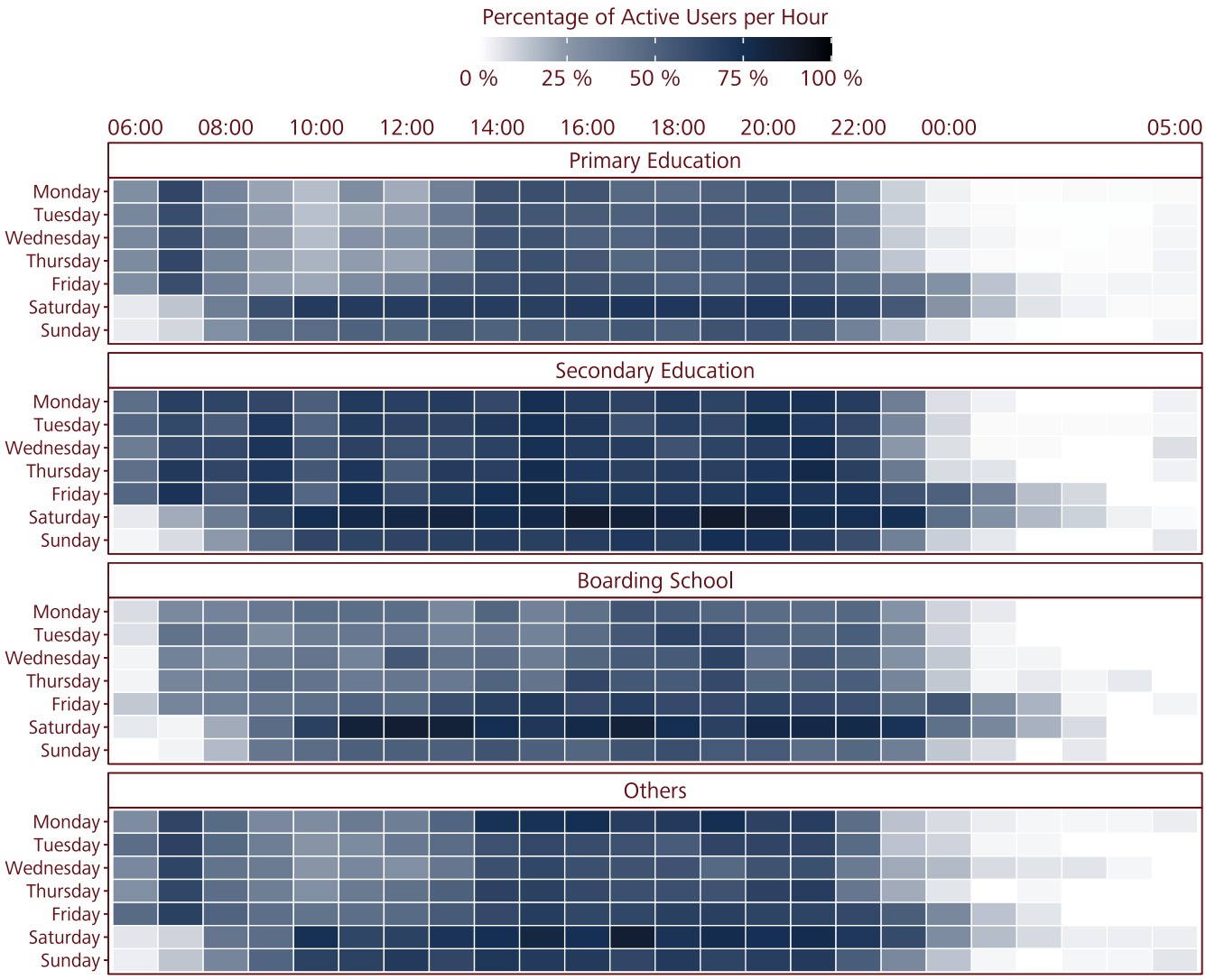
Disaggregating weekday social media activity by educational level revealed distinct engagement patterns across different grade groups (Figure 3.8). Participants in secondary education (Danish: *gymnasium*) demonstrated the most consistent and evenly distributed usage. This group was active almost throughout the waking hours, maintaining steady engagement from early morning to late evening. Their activity also seemed to be less constrained by institutional schedules. On average, secondary education students (*gymnasieelever*) spent 77 minutes actively using social media on weekdays between 8:00 and 14:00, which accounted for 21.3% of the school day (Figure 3.9).

In contrast, students in primary education (Grades 7–10) exhibited a more time-sensitive activity pattern. Theirs peaked in the afternoon and early evening, with lower yet still notable engagement during school hours. Between 08:00 and 14:00, the proportion of active users ranged from 14.95% to 58.50%, indicating that while social media use was less common during instructional periods, it still remained a significant part of students' daily routines. On average, primary education students spent 40 minutes on social media during these hours—equivalent to 11.2% of the school day (Figure 3.9).

Boarding school students (*efterskole*) showed a different daily rhythm, staying highly active on social media from morning through late evening. This likely reflects the social and residential setup of boarding schools, where students live together and have more freedom in their daily schedules. However, there were far fewer of these students in the sample, so their patterns should be interpreted with some caution.

The proportion of active users—defined as the percentage of individuals who opened a social media app each hour—offers a consistent and comparable basis for examining how students at different levels engage with social media (Figure 3.8).

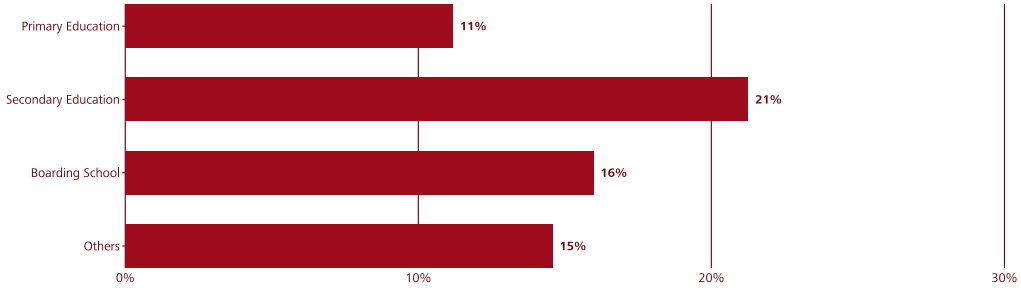
Figure 3.8 **Hourly Social Media Activity Based on Educational Group during the Baseline Period**



Note: Each tile represents a one-hour time window on a specific day of the week, categorized by educational group (primary education, secondary education, boarding school, and others). The shading shows how many users in each group opened a social media app during that hour, compared to how many could have been active. Values ranged from 0% (light) to 100% (dark green). The analysis excluded Fall and Christmas breaks.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 3.9 **Percentage of Social Media Activity During School Hours (08:00–14:00) Based on Educational Groups**



Note: Bars represent the percentage of time students spent being active on social media during weekday school hours, compared to the total available time within this window. Dark red segments represent time spent on social media., while blue segments represent time not spent on it. The dashed vertical line indicates the 20% threshold ("1 in 5" hours). The first day of usage in each period and all observations made during Fall and Christmas breaks were excluded.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

3.6 Platform-Specific Temporal Activity Patterns

The proportion of active users—defined as the percentage of person–hour intervals when an app was opened compared to the total number of intervals in which users could have been active—provides a standardized and comparable basis for analyzing temporal engagement across platforms (Figure 3.10).

Specific platforms had clear variations in activity. Snapchat had the highest engagement frequency, especially on weekends. On Saturdays at 17:00 and 21:00, 62–67% of Snapchat users opened the app. Even early on weekday mornings, activity remained high: at 07:00 on Mondays, 57% of Snapchat users were already active. From Tuesday to Friday, activity at 07:00 remained high at 51–54%, suggesting that the app often serves as a primary point of digital contact.

There were clear weekly temporal variations in platform activity. Snapchat, which had the largest number of distinct users (238) and the highest number of recorded sessions overall, showed the most frequent engagement, especially on weekends. On Saturdays at 17:00 and 21:00, 62–67% of Snapchat users opened the app. Morning activity was also substantial: at 07:00 on Mondays, 57% of users were already active. From Tuesday to Friday, engagement at 07:00 remained elevated at 51–54%, indicating that Snapchat often served as a primary point of digital contact at the start of the day.

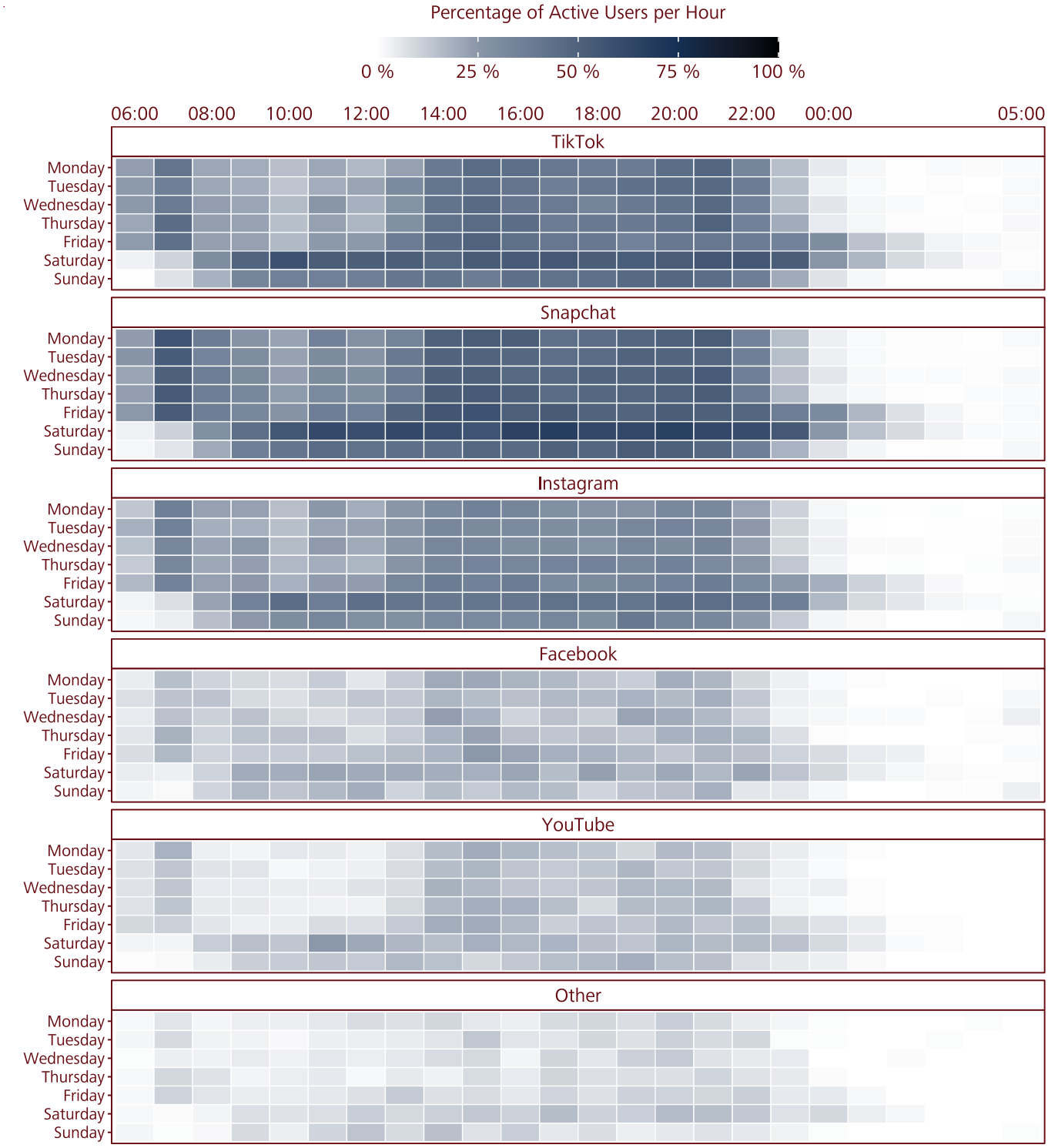
TikTok, used by 189 participants, showed slightly lower opening frequency than Snapchat but accounted for a greater share of total usage time. During the two-week baseline period, the

total time spent on TikTok substantially exceeded that of Snapchat. For example, TikTok activity peaked on Saturday at 10:00 with 48 total hours logged across users during that hour alone. Other high-usage times included Saturday evenings at 21:00 and 22:00, each with over 37 hours of recorded activity and engagement rates of 55%. Even on weekday mornings at 07:00, between 36% and 45% of users opened the app. These patterns indicate that TikTok, while perhaps less frequently opened than Snapchat, retained users' attention for longer periods per session.

Instagram, with 220 users, displayed a flatter engagement curve and fewer sharp peaks. While used regularly, its hourly activation rates were lower than those of Snapchat and TikTok throughout the day and week.

YouTube, used by 125 participants, was most commonly accessed during evening hours, aligning with recreational use outside of school time. Facebook (117 users) and the "Other" category—including Pinterest, Twitter, BeReal, Twitch, Reddit, and LinkedIn—exhibited more sporadic and limited usage patterns, without consistent peaks across time of day or day of week.

Figure 3.10 **Hourly Social Media Activity Based on Social Media Platform During the Baseline Period**



Note: Each tile shows a one-hour time window on a specific day of the week and represents the percentage of participant–hour intervals in which sessions were initiated on a given social media. Thus, it shows how common it was for users to engage with each app during that hour. Rows correspond to weekdays, columns span the hours from 06:00 to 05:00 the next day, and darker shades indicate higher activity (0% = white, 100% = dark green). Each panel displays results for a specific media: Snapchat, TikTok, Instagram, Facebook, YouTube, and an "Other" category combining LinkedIn, BeReal, Pinterest, Twitch, Reddit, and Twitter. Fall and Christmas breaks were excluded from the analysis.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Chapter 4
Intervention Effects on Social Media Activity and Potential Sleep—Experimental Results

4.1 Chapter Summary

Data from the experiment's intervention phase demonstrate how interventions designed to encourage *reflection, planning*, and *waiting* affect young consumers' social media consumption.

The Reflection condition encouraged participants to reflect upon their motivation for consuming social media on every fifth app open attempt. The Waiting condition enforced a delay to disrupt habitual engagement, while the Planning condition encouraged participants to estimate the time required for each social media session.

Key results from the experimental phase include the following:

» **Planning and Waiting Reduces Social Media Activity—But in Different Ways**
Both the *Planning* and *Waiting* interventions significantly reduced participants' daily social media activity, but they affected the number and length of social media sessions differently. The *Waiting* intervention led to significantly fewer but also longer daily sessions. The *Planning* intervention also reduced the overall number of sessions (albeit to a lesser extent than the Waiting intervention) but also increased the average session length less. The intervention effects remained stable throughout the intervention period.

» **TikTok and Snapchat Saw the Largest Drop in Activity**
The largest reductions in overall activity were observed on TikTok and Snapchat. Activity on TikTok declined by 51 minutes (42%) and 44 minutes (39%) in in the Waiting and Planning groups, respectively, whereas Snapchat usage dropped by 28 minutes (40%) and by 27 minutes (37%), in the Planning and Waiting groups, respectively.

» **Interventions Reduced Heavy- and Vulnerable Users' Activity More**
Across all three groups, intervention effects were more pronounced for participants who could be classified as "heavy users". In the Planning group, activity also fell more among users who reported higher social media addiction and lower self-control. In contrast, the Waiting intervention was more effective for users with greater self-control.

» **Interventions Reduced Social Media Activity During School Hours, Leisure Time, and at Night**
Social media activity was high during school hours across all groups; however, the interventions decreased participants' engagement during this period by 40%. Substantial reductions were also observed during afternoon and evening leisure periods, with a sharp decline in session frequency — particularly in the Waiting group. Even nighttime social media activity declined, suggesting that the interventions helped participants disengage during their free time and rest periods.

» **Interventions Increased Potential Sleep**
Both the Planning and Waiting interventions increased the interval between users' last and first daily social media sessions, which is a useful proxy for participants' sleep duration. On average, participants in the Planning group gained 16 minutes and 30 seconds of potential sleep per day, while those in the Waiting group gained 14 minutes and 48 seconds.

» **Interventions did not Affect Users' Satisfaction with Social Media**
Despite the significant reductions in activity, participants did not report feeling less satisfied with social media across the three groups. This indicates that the interventions helped participants reduce superfluous social media consumption without compromising the overall benefits derived from young consumers use of social media.

These results demonstrate that simple behavioral interventions can significantly impact social media consumption, potentially benefiting the health and educational opportunities of young consumers.

4.2 Descriptive Results

The three groups displayed comparable levels of social media activity in terms of their daily social media activity, number of sessions, and session duration during the baseline phase. A comprehensive overview of group-level comparisons during the preintervention period is provided in the technical appendix.[35]

Both the Planning and Waiting interventions resulted in significant and sustained reductions in daily social media activity. Participants of Planning group reduced their time spent by an average of 64 minutes (36.8%). Participants in the Waiting group demonstrated a more significant reduction of 77 minutes (41.3%). In contrast, those in the Reflection group reduced their time by 29 minutes (13.5%). These overall reductions occurred in terms of both frequency and duration of social media engagement. The strongest reductions in session frequency were observed in the Waiting group, where participants reduced their daily sessions from an average of 57.2 to 22.8 (60.2%). Participants in Planning group reduced theirs by 20.6 (38.8 and the Reflection group showed only a modest decline in sessions of just 7.4 sessions (12.2%).

Interestingly, the average session duration increased slightly across all groups. In the Waiting condition, the average session length increased by 60 seconds (23.8%), indicating that participants engaged in fewer but longer sessions. It also increased in the Planning group, although to a smaller extent—by 14 seconds (5.7%). The Reflection group saw only a slight increase of 6 seconds (2.6%).

The results indicated that although both the Planning and Waiting interventions reduced overall social media activity, they did so through different behavioral pathways. The Waiting intervention resulted in sharper reductions in session frequency, accompanied by larger increases in session length, whereas the Planning intervention encouraged slightly fewer but slightly more efficient sessions. Changes in the Reflection group were modest across all metrics.

4.3 Descriptive Results: Platforms

In the Waiting group, the average daily time spent on TikTok dropped by 51 minutes (a 42% reduction), while Snapchat usage declined by nearly 28 minutes (40%). Similarly, the Planning group experienced significant decreases, with TikTok usage declining by 44 minutes (39%)

[35] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

and Snapchat by 27 minutes (37%). Instagram activity also declined by 15 minutes in both groups, while YouTube activity showed larger reductions—approximately 11 and 5 minutes in Waiting and Planning groups, respectively (see Figure 4.1[AMJ1]).

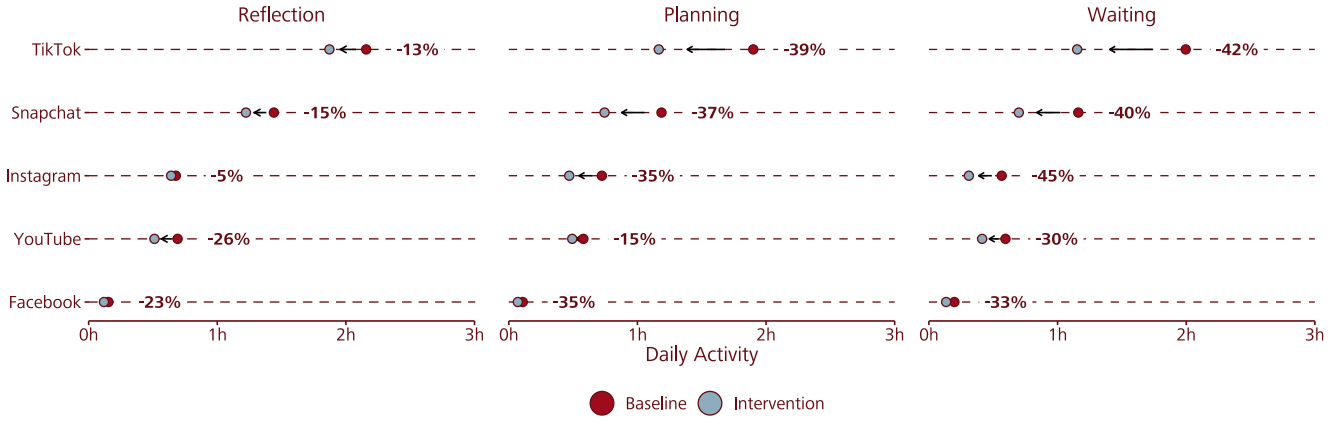
The decline in activity was the result of different intervention effects on the frequency and length of sessions. In the Waiting group, the effect primarily resulted from significant decreases in session frequency. TikTok sessions decreased by 13.8 per day (60%), Snapchat by 17.7 (58%), and Instagram by 8.0 (63%). At the same time, the average session duration increased significantly: TikTok sessions increased by 84 seconds (18%), those of Snapchat by 50 seconds (25%), and those of Instagram by 27 seconds (11%) (see the technical appendix and Figure 4.3).[36] This pattern indicates that participants combined their activity on these platforms into fewer, longer sessions.

In the Planning group, session reductions were more moderate. TikTok sessions declined by 9.0 (41%), those of Snapchat by 10.7 (39%), and those of Instagram by 5.3 (38%). Average session length also only increased modestly. Snapchat sessions increased by 28 seconds (12%), those of TikTok by 20 seconds (4%), while those of Instagram remained essentially unchanged (2%) (see Figure 4.2 and Figure 4.3).

In contrast, the Reflection group experienced only minor changes in activity, with time spent on Snapchat decreasing by 13 minutes (15%), TikTok by 17 minutes (13%) and that of Instagram by just 2 minutes (5%). Session counts showed modest decline—Snapchat (9%), TikTok (12%), Instagram (17%)—while session lengths remained stable or decreased slightly (see Figure 4.2 and Figure 4.3).

Together, these results indicate that although two of the interventions significantly reduced media activity, they affected the number and length of sessions differently. Waiting prompts led to very large reductions in session frequency and longer individual sessions, while planning prompts resulted in more evenly distributed reductions in terms of duration and length of sessions.

Figure 4.1 **Changes in the Average Daily Social Media Activity Between the Baseline and Intervention Periods Based on Platforms and Groups**

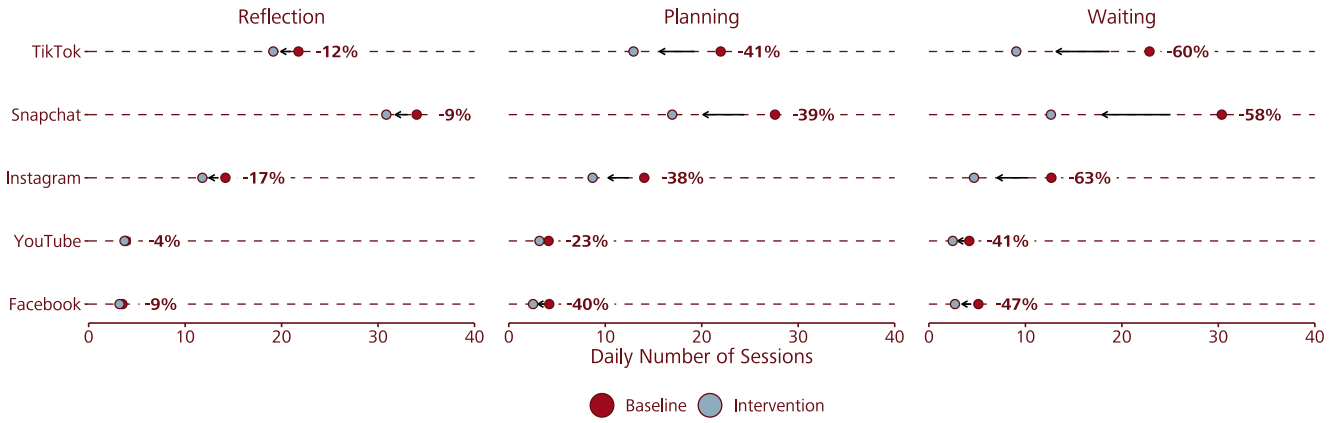


[36] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

Note: This figure displays the average activity (in hours) on five major social media platforms—TikTok, Snapchat, Instagram, YouTube, and Facebook—categorized by experimental condition and platform. For each participant, average daily activity was calculated separately for the baseline and intervention phases. These individual-level averages were subsequently aggregated in terms of platform and intervention to generate group-level means. The change in activity represents the difference between the intervention and baseline averages for each platform and intervention.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

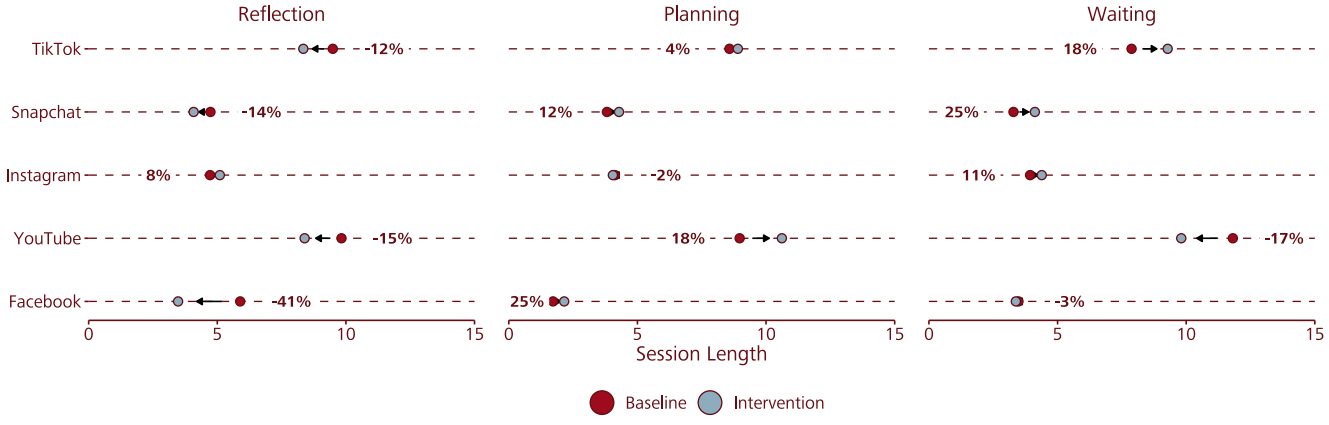
Figure 4.2 **Changes in the Number of Sessions Between Baseline and Intervention Periods Based on Platforms and Groups**



Note: This figure illustrates the average number of sessions for TikTok, Snapchat, Instagram, YouTube, and Facebook, shown separately for the baseline (red) and intervention (blue) phases across the three experimental conditions: Reflection, Planning, and Waiting. For each participant, the median number of session was calculated separately during the baseline and intervention phases. These participant-level medians were subsequently aggregated in terms of interventions and platforms to yield group-level medians. The lines connect the group medians from baseline to intervention, allowing for visual comparison of changes om the amount of sessions.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 4.3 **Changes in Average Session Length Between the Baseline and Intervention Periods Based on Platforms and Group**



Note: This figure displays the average session length (in minutes) for TikTok, Snapchat, Instagram, YouTube, and Facebook, shown separately for the baseline (red) and intervention (blue) phases across the three experimental conditions: Reflection, Planning, and Waiting. For each participant, the average daily session length was initially calculated for each app and phase separately. These daily averages were subsequently aggregated to calculate group-level means based on interventions and platforms. The resulting values indicate how the typical length of individual app sessions changed from baseline to intervention period.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

4.4 Intervention Effects on Social Media Activity

The first analysis examines how participants' total daily activity across ten social media platforms changed from the baseline to the intervention period. The model used for estimating these changes is described in Box 4.1, and the regression results are presented in the technical appendix.[37]

Both the Planning and Waiting interventions led to large and statistically significant reductions in time spent by the participants on social media usage during the intervention phase. In the Planning group, participants reduced their daily social media use by approximately 30.8%[38] (*Estimate* = –0.295, *SE* = 0.058, *z* = –5.05, p < 0.001). A similarly sized effect was observed in the Waiting group, where total activity dropped by 36.1% (*Estimate* = –0.376, *SE* = 0.057, *z* = –6.60, p < 0.001). For someone who typically spends 3 hours per day, this corresponds to a reduction of about 56 minutes in the Planning group and 65 minutes in the Waiting group.

In contrast, participants in the Reflection group—who only received a prompt on every fifth session—did not exhibit a statistically significant change in their social media activity during the intervention phase. Although the model estimated a small decrease in time spent (*Estimate* = –0.073, *SE* = 0.041, *z* = –1.76), this effect did not reach conventional thresholds for statistical significance (*p* = 0.079). In practical terms, this suggests that without more substantial behavioral barriers—such as planning requirements or forced delays—participants' daily engagement levels remained broadly consistent with their baseline levels.

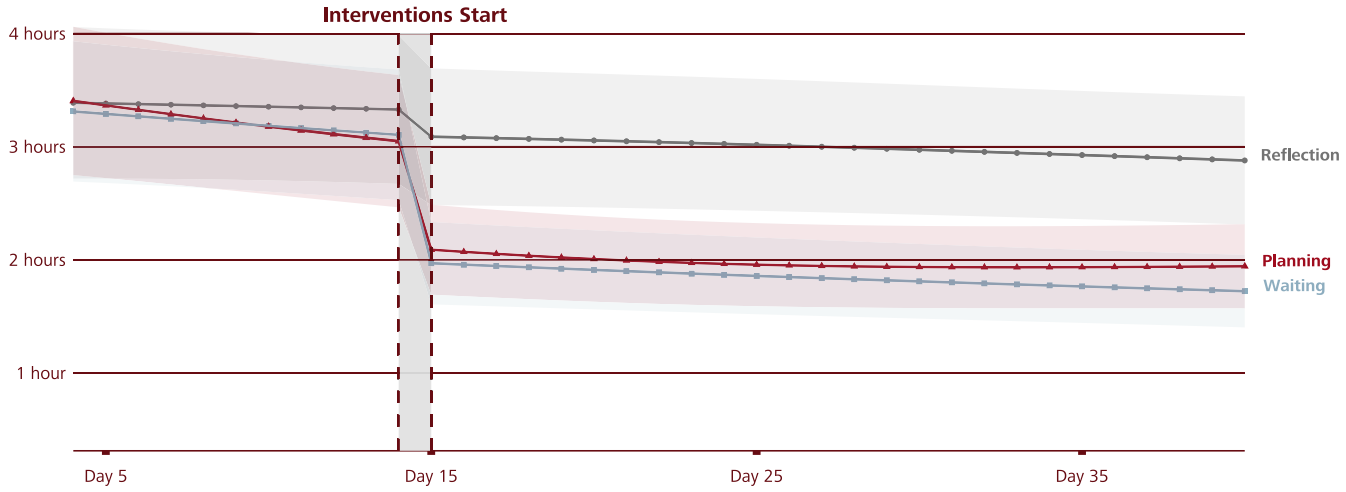
Social media activity changed slightly over time throughout the intervention phase. Participants in the study demonstrated a small yet statistically significant decrease in daily time spent on social media as the experiment progressed, suggesting a slight adaptation to the new habits over time. From the beginning to the end of the intervention period, predicted daily activity decreased by approximately 12 minutes and 36 seconds, 8 minutes and 48 seconds and 14 minutes and 49 seconds in Reflection, Planning and Waiting groups.

Figure 4.4 illustrates the model-predicted daily activity by condition throughout the study duration. The figure illustrates the immediate drops in social media activity after intervention, followed by distinct small dropping trajectories in the three interventions.

Figure 4.4 **Predicted Daily Social Media Activity Between the Baseline and Intervention Periods Based on Platforms**

[37] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

[38] The percentage change was calculated by summing the relevant model estimates for the intervention period and condition interaction, then transforming the result using the exponential function, as appropriate for a Gamma regression model with a log link. The final percentage reflects the relative change from baseline to intervention for each condition, computed as one minus the exponentiated sum of estimates.



Note: This figure shows the model-predicted daily activity on social media (in hours) over the course of the study for each experimental condition: Reflection (black line), Planning (red line), and Waiting (blue line). Solid lines represent predicted values, while shaded areas represent 95% confidence intervals. The transition from baseline to intervention is indicated by the gray-shaded area between day 14 and day 15, with vertical dashed lines indicating the boundary. Predictions started on Day 4 due to the use of a 3-day rolling average and the exclusion of the first day in each period for smoothing.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

4.5 Moderation: Heavy-, Average-, and Light Social Media Users

To determine whether the interventions affected light and heavy users differently, a model was estimated to examine whether changes in activity depended on participants' baseline social media usage. This analysis expanded upon the activity model outlined in Box 4.1 (Model 1.1) and incorporated participants' average baseline activity as a moderator, standardized as a z-score. Complete model results are presented in the technical appendix.[39]

In the Planning group, participants with higher baseline social media activity reduced their consumption of social media more during the intervention phase. For each one standard deviation increase in baseline activity, the estimated intervention effect increased by 8.4%[40] (*Estimate* = –0.087, *SE* = 0.020, *z* = –4.34, *p* < 0.001). For the average heavy user, whose baseline usage is 4 hours and 20 minutes per day, this reduction results in a predicted decrease of approximately 1 hour and 36 minutes in daily social media use (a 36.9% reduction), compared to a 31.1% reduction for average users and a 24.8% reduction for light users (Figure 4.5).

The Waiting group followed a similar pattern. Participants with higher initial activity reduced their consumption more than lighter users, as reflected by a statistically significant interaction (*Estimate* = –0.092, *SE* = 0.017, *z* = –5.43, p < 0.001), which corresponds to an additional 8.8%

[39] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

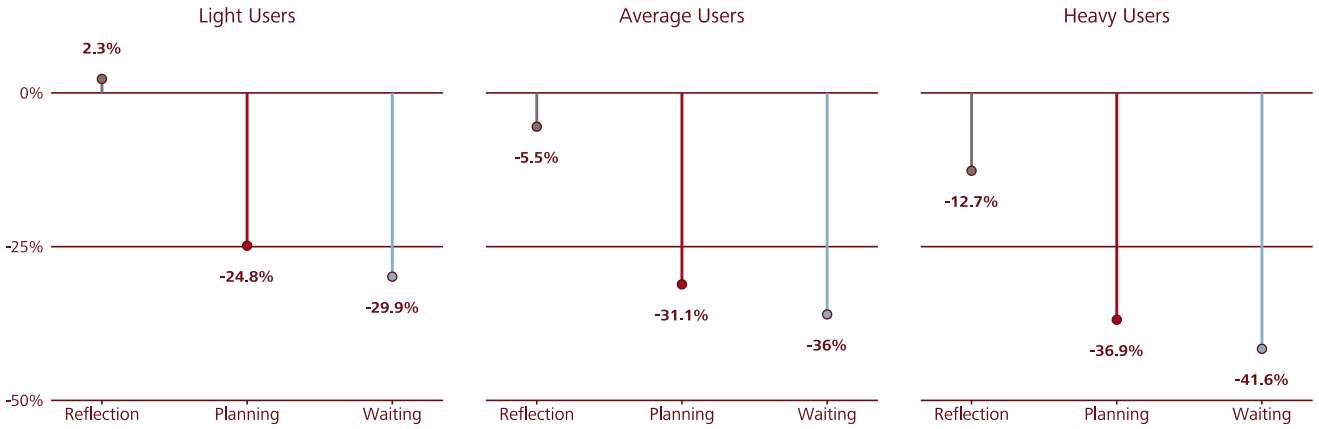
[40] These estimates are based on a log-linked Gamma model. Estimates reflect log-scale effects and were transformed to percent change using the formula: 100 × (exp(estimate) – 1).

decrease in social media activity per standard deviation increase at baseline. For heavy users,[41] daily activity decreased by 1 hour and 48 minutes (41.6%), whereas average users reduced theirs by 36%, and light users reduced theirs by 29.9%.

Even in the Reflection group, where no overall reduction in activity was observed at the group level, heavy users still reduced their activity more than light users. Each standard deviation increase in baseline activity was associated with an additional reduction of 15% (*Estimate* = –0.079, *SE* = 0.019, *z* = –4.26, p < 0.001). Predicted values show that heavy users reduced their activity by 33 minutes and 1 second (12.7%), without much change in that of average users (5.5% decrease); however, light users slightly increased their use by 2.3%.

These findings indicate that all three interventions—but particularly Planning and Waiting—had a larger impact on participants who consumed social media more intensely during the baseline period.

Figure 4.5 **Predicted Daily Social Media Activity Based on Group, Intervention Period, and Usage Intensity**



Note: The y-axis shows the predicted change in daily social media activity from baseline to intervention period. Each vertical segment represents the estimated change (either reduction or increase) for participants in the Reflection (gray), Planning (red), and Waiting (blue) group. Points indicate the predicted percentage change from baseline to intervention period. The results are presented separately for light, average, and heavy baseline users (from left to right), defined as ±1 standard deviation from the sample mean.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

4.6 Moderation: Self-Control and Social Media Addiction

Based on the moderation of baseline activity, additional models were specified to test whether the effects of the interventions varied according to participants' psychological traits. In particular, these models include self-control and social media addiction as continuous moderators

[41] Heavy users are defined as those whose baseline social media use is one standard deviation above the mean, corresponding to an average daily use of 4 hours and 20 minutes. The percentage reductions (36.9% for Planning, 41.6% for Waiting, and 12.7% for reflection) are applied to this baseline usage, so the changes in minutes will vary depending on the starting point.

to determine how individual differences in these traits interact with changes to social media activity. These effects were evaluated using the interaction models outlined in Box 4.1, with regression results provided in technical appendix.[42]

The interaction between intervention effects and social media addiction was most pronounced in the Planning group (Figure 4.6). Participants in this group with high addiction scores reduced their daily activity by 38.1%, while those with average scores reduced theirs by 30.9%, and those with low scores by 22.8% (cf. Figure 4.6). The amplified effect on those with higher addiction was statistically confirmed by a significant interaction between addiction scores and the intervention effect (*Estimate* = –0.110, *SE* = 0.019, *z* = –5.848, p < 0.001), indicating an additional 11.6% activity reduction for each unit increase in the standardized addiction score.[43] In the Reflection and Waiting groups, intervention effects were consistent across addiction levels, with no significant observable moderation.

The interaction between reduced activity and self-control ran along the same lines (Figure 4.7). In the Planning group, participants with less self-control experienced larger reductions in activity, reducing their daily usage by 36.1%. Those with average self-control reduced their usage by 30.6%, while participants with high self-control decreased theirs by only 24.5%. This finding was supported by a significant interaction (*Estimate* = 0.084, *SE* = 0.021, *z* = 4.03, p < 0.001), indicating that each unit increase in self-control was associated with an 8.8% smaller reduction in daily social media activity.

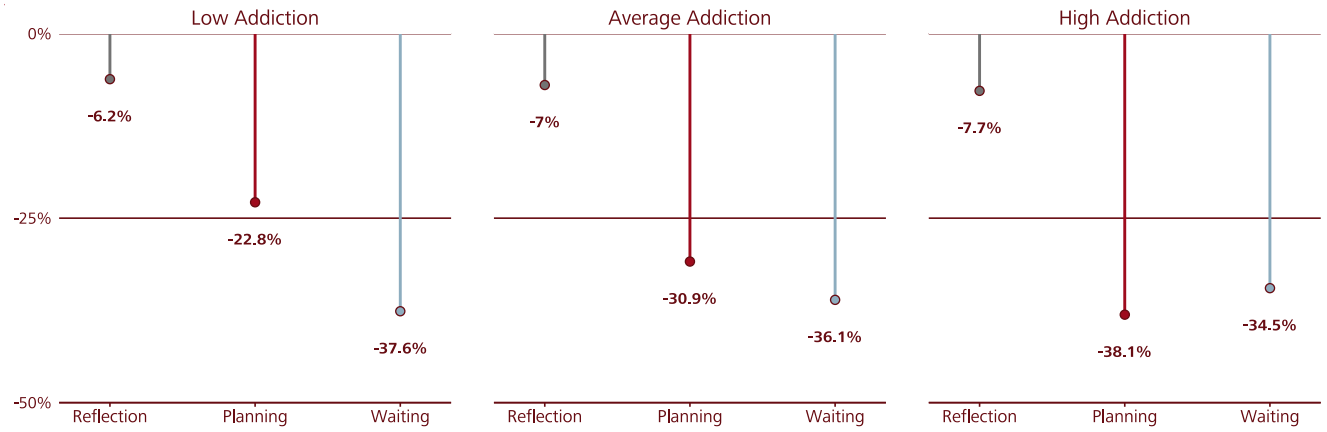
In contrast, within the Waiting group participants with higher self-control scores reduced their social media activity more —by 39.1%. While those with average self-control reduced theirs by 35.8%, and those low self-control experienced a smaller reduction of 32.3%. This was supported by a significant negative interaction (*Estimate* = –0.053, *SE* = 0.018, *z* = –2.98, p = 0.003), suggesting that the waiting prompt was particularly effective among those who generally had stronger self-regulation.

Participants in the Reflection group showed only minimal changes, with reductions in time spent ranging from 6-8%, regardless of their baseline vulnerability.

Figure 4.6 **Predicted Changes in Daily Social Media Activity Based on Social Media Addiction Levels and Intervention Groups**

[42] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

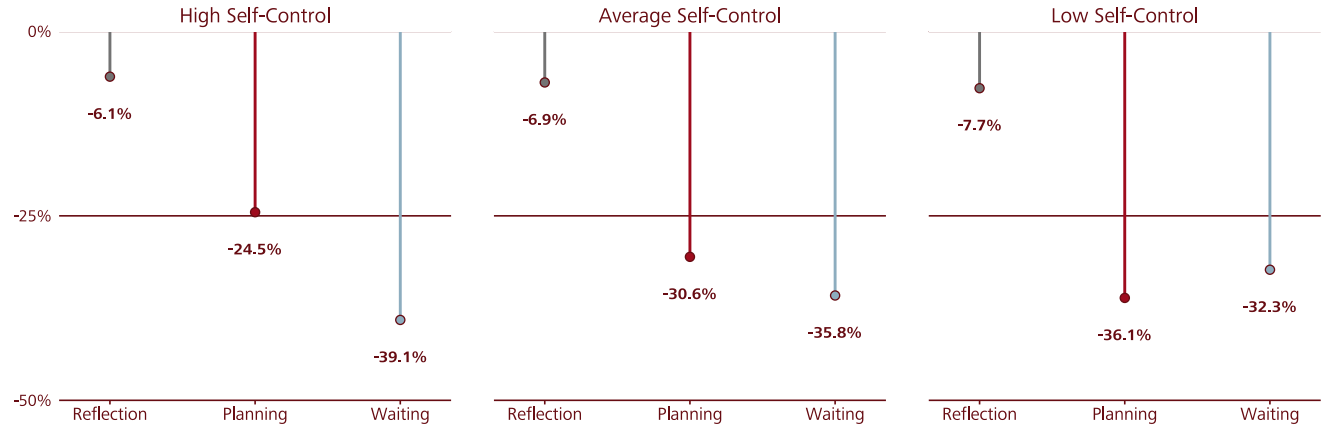
[43] This estimate is based on a log-linked Gamma model. Estimates reflect log-scale effects and were transformed to percent change using the formula: 100 × (exp(estimate) – 1).



Note: The figure shows model-predicted changes in average daily activity on social media between the baseline and intervention periods, categorized by social media addiction level (low, average, and high) and intervention (Reflection, Planning, and Waiting). Vertical lines represent the predicted percentage change from baseline to intervention. Predictions are based on a gamma-distributed mixed-effects model that includes social media addiction as a standardized moderator.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 4.7 **Predicted Changes in Daily Activity Based on Self-Control Levels and Groups**



Note: The figure illustrates model-predicted changes in average daily social media activity between the baseline and intervention periods, based on participants 'self-control levels (low, average, and high) and intervention conditions (Reflection, Planning, and Waiting). Each vertical line indicates the magnitude of change in percentages, while adjacent labels report the estimated reduction. Predictions are based on a gamma-distributed mixed-effects model that includes self-control as a standardized moderator.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

4.7 Intervention Effects: Number of Sessions and Session Length

Two complementary outcomes—the number of daily sessions and the average duration of each session—were analyzed to further investigate how the interventions reduced daily social media activity. Daily session counts were modeled as outlined in Box 4.1.

Results revealed substantial reductions in daily sessions for both the Planning and Waiting groups. In the Planning group, participants reduced their session frequency by approximately 37.8% during the intervention period (*Estimate* = –0.355, *SE* = 0.039, *z* = –9.027, $p < 0.001$). Participants in the Waiting group saw even larger reductions in terms of daily sessions that fell by 58.8% (*Estimate* = –0.767, *SE* = 0.039, *z* = –19.613, $p < 0.001$). These findings suggest that the introduction of friction—especially in the Waiting group—effectively disrupted participants' habitual interaction with social media.[44]

A slight but statistically significant reduction was also observed in the Reflection group where participants reduced their daily session count by approximately 11.3% (*Estimate* = –0.120, *SE* = 0.027, *z* = –4.398, $p < 0.001$). Although friction was applied only intermittently in this condition, the result suggests that even low-frequency prompts may influence social media activity to a modest degree. Full regression results are presented in the technical appendix.[45]

Session length was analyzed using the modeling approach described in Box 4.1. In the Waiting group, participants increased their session lengths by approximately 40.4% during the intervention phase (*Estimate* = 0.304, *SE* = 0.052, *z* = 5.87, $p < 0.001$), indicating a shift toward longer but fewer sessions. The Planning group also experienced a meaningful increase in average session duration—about 27.4% (*Estimate* = 0.206, *SE* = 0.053, *z* = 3.91, $p < 0.001$)—suggesting a uniform change in terms of frequency and usage intensity of social media.

In the Reflection group, there was no significant change in session duration (*Estimate* = 0.036, *SE* = 0.037, *z* = 0.96, $p = 0.339$), indicating that patterns of user interaction largely remained consistent throughout the intervention phase. The regression results for session duration are provided in the technical appendix.[46]

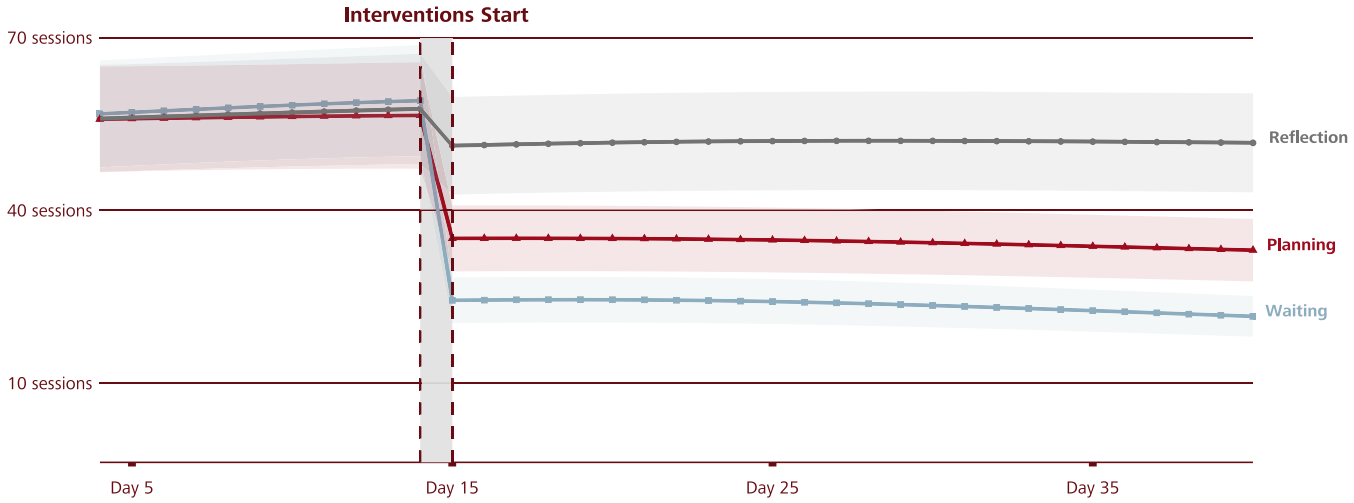
In a nutshell, these findings demonstrate that the interventions reshaped engagement patterns through various behavioral pathways. The Waiting prompt reduced participants' social media activity primarily by cutting down on session frequency while encouraging longer sessions. In contrast, the Planning intervention led to moderate but lasting reductions in terms of frequency and only slight increases to the duration of participants' social media activity (see Figure 4.8 and Figure 4.9).

Figure 4.8 **Predicted Daily Sessions across the Baseline and Intervention Periods**

[44] These percentage reductions were calculated by combining the general change from baseline to intervention with the additional reduction specific to each intervention group. In other words, they reflect how much lower session frequency was during the intervention compared to the baseline, after accounting for the effect already observed in the Reflection group.

[45] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

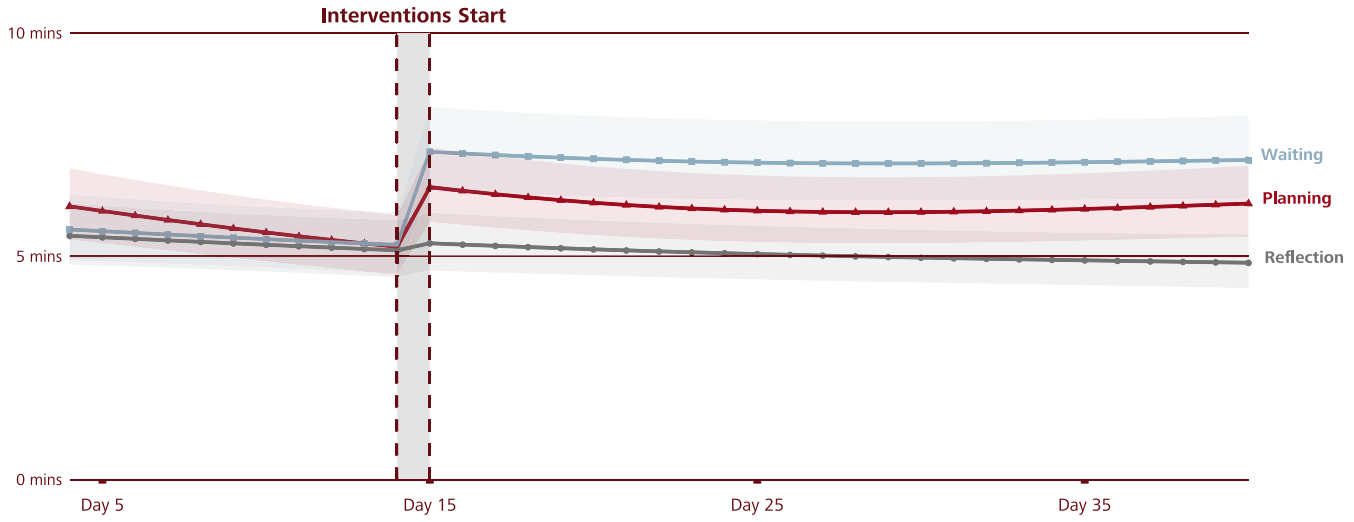
[46] DCCA (2025): Disrupting Social Media Habits - Technical Appendix



Note: This figure shows the model-predicted daily number of social media sessions throughout the study for each experimental condition: Reflection (black line), Planning (red line), and Waiting (blue line). Solid lines represent predicted values, while shaded areas indicate 95% confidence intervals. The transition from baseline to intervention is highlighted by the gray-shaded area between Day 14 and Day 15, with vertical dashed lines indicating the boundary. Due to the use of a 3-day rolling median and the exclusion of the first day in each period for smoothing, predictions started on Day 4.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

Figure 4.9 **Predicted Average Session Length across the Baseline and Intervention Periods**



Note: This figure illustrates the model-predicted average session duration (in minutes) throughout the study for each experimental condition: Reflection (black line), Planning (red line), and Waiting (blue line). Solid lines represent predicted values, while shaded areas indicate 95% confidence intervals. The transition from baseline to intervention is indicated by the gray-shaded area between Day 14 and Day 15, with vertical dashed lines indicating the boundary. Due to the use of a 3-day rolling average and the exclusion of the first day in each period for smoothing, predictions started at Day 4

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025

Box 4.1
Modeling Behavioral Outcomes: Daily Social Media Activity, Number of Sessions, and Session Lengths

Behavioral outcomes were analyzed using generalized linear mixed-effects models (GLMMs), selected to align with the distributional characteristics of the respective dependent variable.

The outcomes represented the three key aspects of digital engagement presented in the report: total daily social media activity (minutes spent across platforms), daily number of sessions, and daily average session duration. All models were specified using an interrupted time series design, enabling estimation of condition-specific changes in behavior following the start of the intervention, while accounting for temporal drift throughout the experiment across conditions and repeated measures within individuals.

Preprocessing and Exclusions
Three calendar days were systematically excluded from all datasets due to these days reflecting atypical behavior of a given period:

3. The first day of the baseline period (14 days before intervention onset)
4. The first day of the intervention period
5. The final day of intervention tracking

These exclusions addressed common sources of distortion, including behavioral transitions, anticipatory effects, and incomplete logging due to staggered intros/exits.

Following these exclusions, a 3-day rolling window was applied to each outcome to reduce short-term noise and enhance trend stability. Smoothing was conducted separately within individuals and stratified by study period (baseline vs. intervention), with the method adapted to the scale of each outcome:

» Social media activity (total minutes per day) and session duration, both continuous and right-skewed, were smoothed using a 3-day rolling mean.
» Number of daily sessions, a discrete count variable representing daily app sessions, was smoothed using a 3-day rolling median. This approach maintained the count-like nature of the outcome while attenuating the influence of short-term spikes.

All smoothing procedures were right-aligned, such that each value reflected the current day and the two preceding days. Consequently, the first two days of each time series—within both the baseline and intervention periods for each individual—lacked smoothed values and were excluded from modeling.

Shared Model Structure
All models followed an interrupted time series specification and were estimated using generalized linear mixed-effects models. Each model included the following components:

» A binary indicator for period, coded as baseline or intervention. The baseline period served as the reference category.
» A categorical variable for experimental condition, with three levels: Reflection, Waiting, and Planning. Reflection was treated as the reference group in all analyses.
» A random intercept for each participant (ID) to account for within-subject correlation due to repeated measures.
» Time trends were modeled using natural splines with 2 degrees of freedom, fit separately for each condition to flexibly account for non-linear change over time
» A consistent set of demographic and contextual covariates (listed at the end of this box) was included across all models to control for background variation unrelated to the experimental manipulation.

Each model's key term of interest was an interaction involving period and condition, which in three models was further moderated by an individual difference variable. These interactions were specified to estimate the difference in the behavioral outcome before and after the

intervention separately for each condition, within a single unified model. This allowed for direct comparison of condition-specific intervention effects while controlling for temporal trends and repeated measures.

Model 1: Daily Activity

The first model examined how the total daily time participants spent on social media varied in response to the interventions. The dependent variable was defined as the total number of minutes spent per day across ten tracked social media platforms. Because the distribution of time spent was continuous, strictly positive, and right-skewed, a gamma distribution with a log link was used within a mixed-effects framework. The key terms of interest were the set of coefficients representing the interaction between the study period and the assigned intervention condition. This interaction captured whether the onset of the intervention led to condition-specific shifts in time spent on social media:

$$\text{Activity}_{i,t} = \beta_0 + \gamma_1\left(\text{Period}_{i,t} \cdot \text{Condition}_i\right) + \gamma_2 f\left(\text{Time}_{i,t}\right): \text{Condition}_i + \mathbf{Z_i}\beta + u_i + \varepsilon_{i,t}$$

In this formulation, the outcome $\mathbf{Activity_{i,t}}$ reflects the total minutes of social media use for participant i on participation day $\boldsymbol{t}$. The term $\boldsymbol{\gamma_1}$ represents the coefficients that together estimate whether activity patterns changed after the intervention and whether those changes differed between experimental groups. This interaction between period and condition yields three distinct coefficients—one for each non-reference group and time contrast—allowing for direct estimation of intervention effects across all conditions.

The term $\boldsymbol{\gamma_2}$ represents the coefficients for the time trend function, which includes natural splines fitted separately for each condition with two degrees of freedom to capture nonlinear temporal patterns. As each condition is modeled separately, this results in a total of six time spline-related coefficients.

The term $\mathbf{Z_i\beta}$ represents the introduction of control variables including: gender, fall break, region, and education level. The random effect $\mathbf{u_i}$ captures individual-level variability, and $\boldsymbol{\varepsilon_{i,t}}$ represents residual error.

Model 1.1: Moderation of Intervention Effects by Baseline Activity

An extended model examined whether the effect of the intervention on daily social media use varied as a function of participants' baseline engagement levels. Baseline engagement was defined as each participant's average daily time spent on social media during the baseline period, standardized as a z-score. To capture potential moderation, the model included a three-way interaction between study period, experimental condition, and baseline use:

$$\text{Activity}_{i,t} = \beta_0 + \gamma_1\left(\text{Period}_{i,t} \cdot \text{Baseline Use}_i \cdot \text{Condition}_i\right) + \gamma_2 f\left(\text{Time}_{i,t}\right): \text{Condition}_i + \mathbf{Z_i}\beta + u_i + \varepsilon_{i,t}$$

In this formulation, the outcome remains the total number of minutes participant i spent on social media on day *t*. The set of coefficients denoted by $\boldsymbol{\gamma_1}$ represents the three-way interaction among study period (baseline vs. intervention), experimental condition (Reflection, Waiting, Planning), and standardized baseline use. This interaction estimates whether intervention-related changes in social media use differed depending on participants' pre-intervention activity levels across conditions. All other model components—including control variables, natural splines for time, participant-level random intercepts, and residual error—remain unchanged from the main specification.

Model 1.2: Moderation of Intervention Effects by Social Media Addiction

A second moderation model extended the main activity specification to test whether the effect of the intervention varied as a function of participants' levels of problematic social media use. Social media addiction was assessed prior to the start of the intervention using the Bergen Social Media Addiction Scale and standardized as a z-score. The model incorporated a three-way

interaction among study period, experimental condition, and pre-intervention addiction levels:

$$\text{Activity}_{i,t} = \beta_0 + \gamma_1(\text{Period}_{i,t} \cdot \text{Addiction}_i \cdot \text{Condition}_i) + \gamma_2 f(\text{Time}_{i,t}) : \text{Condition}_i + \mathbf{Z_i}\beta + u_i + \varepsilon_{i,t}$$

In this formulation, the term γ_1 represents the coefficients associated with the three-way interaction between the study period (baseline vs. intervention), intervention condition (Reflection, Waiting, Planning), and participants' standardized addiction scores, measured before the intervention began. This structure allows the model to test whether the intervention effects on social media activity differed across individuals with higher versus lower pre-intervention addiction levels, and whether those moderation patterns varied by condition. All other components of the model remain the same as before, including the outcome, control variables, random intercepts, and residual error term respectively.

Model 1.3: Moderation of Intervention Effects by Self-Control

A third moderation model tested whether participants' level of self-control influenced how they responded to the intervention. Self-control was assessed prior to the intervention using a validated scale and standardized as a z-score. The model specified a three-way interaction between the study period, intervention condition, and participants' pre-intervention self-control levels:

$$\text{Activity}_{i,t} = \beta_0 + \gamma_1(\text{Period}_{i,t} \cdot \text{Self-control}_i \cdot \text{Condition}_i) + \gamma_2 f(\text{Time}_{i,t}) : \text{Condition}_i + \mathbf{Z_i}\beta + u_i + \varepsilon_{i,t}$$

In this formulation, the dependent variable reflects the total number of minutes participant i spent on social media on day *t*. The γ_1 term captures the coefficients associated with the three-way interaction between period (baseline vs. intervention), experimental condition (Reflection, Waiting, Planning), and self-control, measured prior to the intervention. This specification tests whether individuals with higher or lower levels of self-control responded differently to the intervention across conditions. As with the previous models, γ_2 models time trends flexibly using condition-specific natural splines with two degrees of freedom. The $\mathbf{Z_i}\beta$ term includes demographic and contextual control variables (gender, fall break, region, education level), while u_i and $\varepsilon_{i,t}$ capture participant-level random effects and residual error, respectively.

Model 2: Daily Sessions

The second behavioral outcome examined whether the intervention affected the frequency with which participants opened social media apps. The outcome was defined as the number of discrete app-opening events per day. To reduce short-term volatility while preserving the count-based structure of the data, a 3-day rolling median was applied to the raw session counts. This smoothed outcome was modeled using a truncated negative binomial distribution with a log link, which accommodates the count nature of the data, its overdispersion, and the absence of zeros (since only active days were included). The primary term of interest was the interaction between study period and intervention condition:

$$\text{Sessions}_{i,t} = \beta_0 + \gamma_1(\text{Period}_{i,t} \cdot \text{Condition}_i) + \gamma_2 f(\text{Time}_{i,t}) : \text{Condition}_i + \mathbf{Z_i}\beta + u_i + \varepsilon_{i,t}$$

In this model, the outcome $\mathbf{Sessions_{i,t}}$ represents the number of app-opening events by participant *i* on day *t*. The $\boldsymbol{\gamma_1}$ term represents the coefficients for the interaction between the study period (baseline vs. intervention) and the assigned condition (Reflection, Waiting, Planning), capturing whether app-opening behavior shifted in condition-specific ways following the intervention onset. The $\boldsymbol{\gamma_2}$ term includes the coefficients for time trends modeled using natural splines with two degrees of freedom, fitted separately for each condition to flexibly account for nonlinear temporal dynamics. The term $\mathbf{Z_i\beta}$ represents the control variables

(gender, fall break, region, education), $\mathbf{u_i}$ is the participant-specific random intercept, and $\boldsymbol{\varepsilon_{i,t}}$ denotes the residual error.

Model 3: Average Session Length

The final behavioral model assessed whether the intervention led to changes in the average duration of social media sessions. For each participant, the daily average session length was calculated and smoothed using a 3-day rolling mean to stabilize short-term fluctuations while preserving its continuous structure. The resulting outcome was strictly positive and right-skewed, and was therefore modeled using a gamma distribution with a log link within a generalized linear mixed-effects framework. The model's primary terms of interest were again the interaction between study period and intervention condition:

$$\textbf{Session Duration}_{i,t} = \beta_0 + \gamma_1(\textbf{Period}_{i,t} \cdot \textbf{Condition}_i) + \gamma_2 f(\textbf{Time}_{i,t}) : \textbf{Condition}_i + Z_i\beta + u_i + \varepsilon_{i,t}$$

In this formulation, the dependent variable $\textbf{Session Duration}_{i,t}$ reflects the mean number of minutes per session for participant *i* on day *t*. The term γ_1 represents the coefficients for the interaction between the study period (baseline vs. intervention) and condition (Reflection, Waiting, Planning), estimating whether average session duration changed following the onset of the intervention in a condition-specific manner. Time was again flexibly modeled via condition-specific splines, while $\mathbf{Z_i\beta}$, $\mathbf{u_i}$ and $\boldsymbol{\varepsilon_{i,t}}$ represent covariates, random participant effects, and residual variation, respectively.

Shared Control Variables:

All behavioral outcome models were adjusted using the same set of control variables, which were consistently applied throughout the report to account for demographic and contextual variation not attributable to the intervention:

- Gender (binary indicator: male or female)
- Fall break (a binary indicator for whether the observation occurred during the Fall holiday period)
- Region (one of the five Danish administrative regions; the Capital Region serves as the reference group in comparison to Mid Jutland, Northern Jutland, Zealand, and Southern Denmark)
- Educational track, coded as a four-level factor: primary education (reference), secondary education, boarding school, and other (including miscellaneous educational details).

4.8 Intervention Effects: Temporal Distribution of Social Media Activity

The interventions led to overall reductions in social media activity and the number of sessions per day. To gain a better understanding, the effects of when these changes occurred, an additional analysis was run to map them to different parts of the day, with separate considerations for weekdays and weekends. This enabled an assessment of whether the interventions were particularly effective during specific parts of the day, such as school hours, afternoons, evenings, or nights.

Weekdays

The interventions reduced activity and session frequency across all periods of the weekday, with significant absolute reductions observed during school hours (08:00–14:00), afternoons (14:00–18:00), and evenings (18:00–24:00). Both the Planning and Waiting interventions reduced participants' time spent on social media during school hours by 19 minutes and 12 seconds (40.0%) and 18 minutes and 54 seconds (40.0%), respectively. In contrast, the Reflection group achieved only a 3 minutes and 36 seconds reduction (7.0%) during school hours.

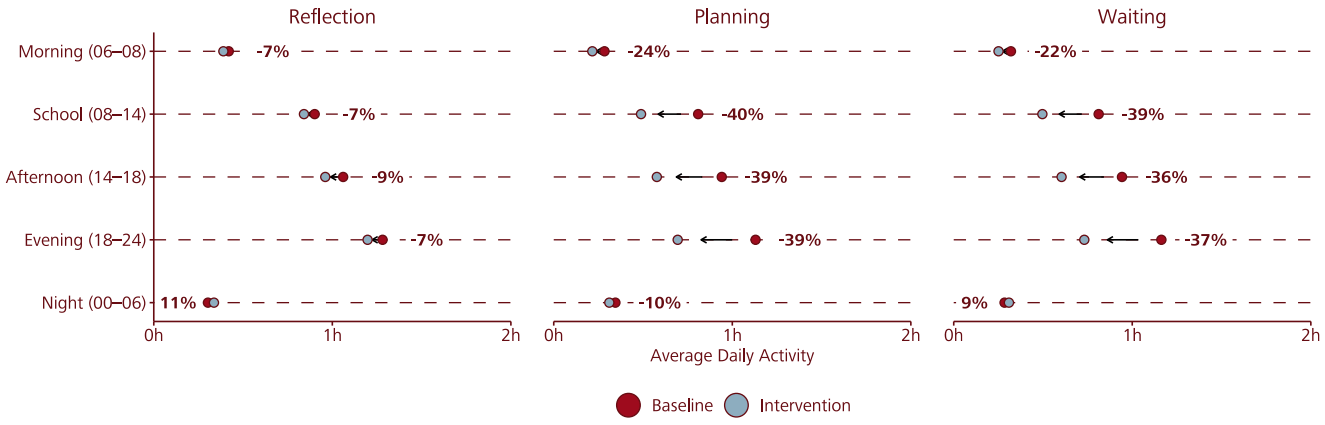
Substantial reductions were also observed during afternoons and evenings. In the Planning group, participants spent 21 minutes 48 seconds less on social media in the afternoon (38.6%) and 26 minutes 12 seconds less in the evening (38.6%) than they did during the baseline period. The Waiting group showed similar declines: 20 minutes and 18 seconds (35.9%) in the afternoon and 25 minutes and 54 seconds (37.1%) in the evening. In the Reflection group, reductions in activity during these periods were minor, and all below 10%.

Changes to the number session reflected this pattern. The most significant reductions in the number of sessions were observed during the evening and school hours, although afternoons also saw notable declines. In the Waiting group, participants averaged 12.5 fewer sessions in the evening (57.7%), 8.6 fewer during school hours (55.8%), and 8.8 fewer in the afternoon (54.7%). The Planning group cut their sessions by 10.2 in the evening (44.1%), 6.2 during school hours (41.3%), and 6.5 in the afternoon (39.8%).

These findings support earlier results: The Waiting intervention was particularly effective at reducing the frequency of social media interactions, resulting in fewer but longer sessions. Meanwhile, the Planning intervention resulted in similar reductions in total time spent due to creating more moderate changes to session durations. These effects indicate that both interventions significantly reduced habitual social media engagement during key weekday time windows—during school, after school, and in the evening. The Reflection group – again- saw more modest effects, with an average reduction in session count of approximately 8% across all time windows.

These results are illustrated in Figure 4.10 (in terms of activity) and Figure 4.11 (in terms of sessions).

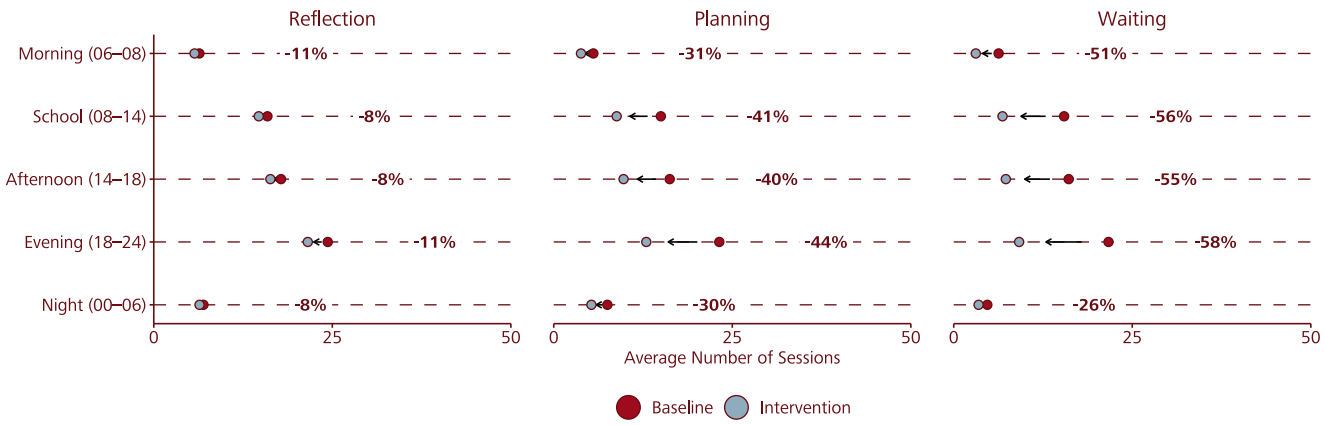
Figure 4.10 **Changes in Average Daily Social Media Activity Based on Group and Weekday Time Windows**



Note: This figure shows the average activity (in minutes) on social media per participant across five weekday time windows: morning (06:00–08:00), school hours (08:00–14:00), afternoon (14:00–18:00), evening (18:00–24:00), and night (00:00–06:00). Changes are shown separately for the Reflection, Planning, and Waiting groups, comparing baseline (red) and intervention (blue) periods. Percent labels indicate the relative change within each time window. Averages do not include the first day of usage for each period or any observations during Fall and Christmas breaks.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 4.11 **Changes in Average Number of Sessions on Social Media Based on Groups and Weekday Time Windows**



Note: This figure presents the average number of social media sessions per participant across five weekday time windows: Morning (06:00–08:00), School hours (08:00–14:00), Afternoon (14:00–18:00), Evening (18:00–24:00), and Night (00:00–06:00). Bars indicate the average daily session counts during the baseline (red) and intervention (blue) periods for each intervention group, while percentage labels indicate the proportional reduction in session frequency for each time window. Averages excluded the first day of usage in each period and all observations during Fall and Christmas breaks.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Weekends

During the weekends, the interventions continued to reduce participants' social media use across all major parts of the day. Given the more flexible structure of weekends—characterized by later wake times and the absence of school obligations—social media activity was analyzed using four broader time windows: first part of the day (06:00–14:00), afternoon (14:00–18:00), evening (18:00–24:00), and night (00:00–06:00).

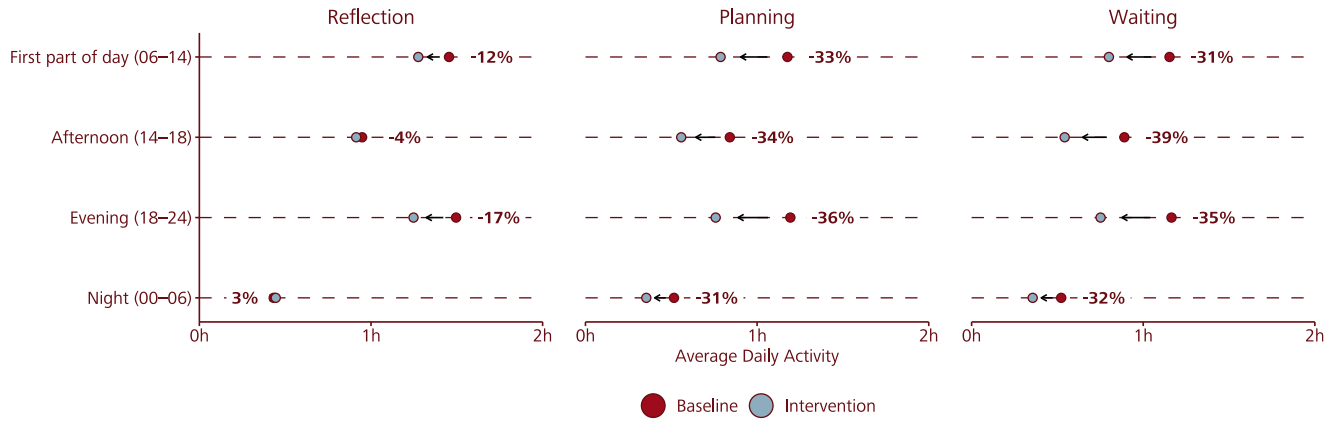
Both the Planning and Waiting interventions resulted in consistent and considerable activity reductions across these periods (Figure 4.12). In the Planning group, participants reduced their social media use by approximately one-third in each time window, with significant reductions in the evening (36.5%), afternoon (33.7%), and first part of the day (33.1%). The Waiting group exhibited a similar pattern, with a significant large reduction in the afternoon (39.0%), followed by slightly smaller reductions in the evening (35.5%) and morning hours (30.6%). Participants' nighttime usage of social media also declined by 31–32% in both groups.

The frequency of sessions followed the same pattern (Figure 4.13). In the Waiting group, the number of daily sessions decreased by over 50% across all time windows, with a 63% reduction in the evening. The Planning group also saw a significant decline in the frequency of social media sessions across all periods, albeit somewhat less pronounced. On weekdays, the underlying change to sessions frequency and length differed: Waiting resulted in sharper reductions in session counts, while Planning led to more moderate declines accompanied by smaller increases in session duration.

In contrast, the Reflection intervention resulted in only modest changes. Reductions in activity and sessions were minimal in the early day and evening, with almost no change in the afternoon. The duration of nighttime activity even increased slightly.

These findings confirm that both Planning and Waiting interventions effectively reduced weekend social media activity.

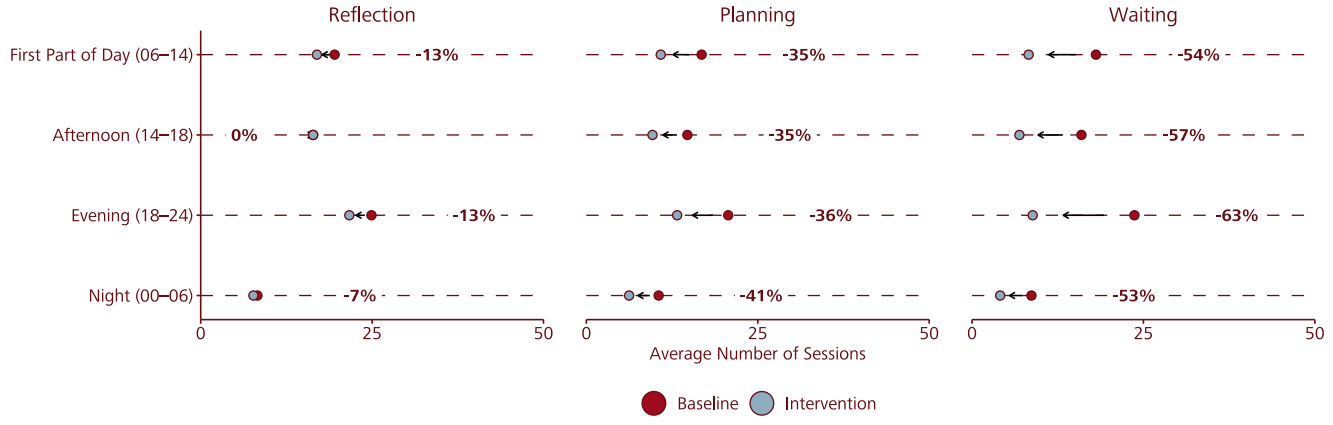
Figure 4.12 **Changes in Average Social Media Activity Based on Groups and Weekend Time Windows**



Note: Each point represents the average activity (in minutes) on social media across four weekend time windows: first part of day (06:00–14:00), afternoon (14:00–18:00), evening (18:00–24:00), and night (00:00–06:00). Red points represent baseline usage, while blue points indicate usage during the intervention phase. Percentage labels represent the relative change in activity from baseline to intervention. Averages excluded the first day of usage for each period and all observations during Fall and Christmas breaks.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 4.13 **Changes in Average Number of Session Based on Groups and Weekend Time Windows**



Note: Each point represents the average number of social media sessions initiated during the four weekend time windows. Session data is reported for the baseline and intervention periods, with red points representing the baseline and blue points representing the intervention. Percentage labels indicate the relative change in session frequency. Time windows represent typical weekend routines, as school schedules are not in effect. The first day of usage in each period, and all days during Fall and Christmas breaks were excluded in the analysis.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

4.9 The Social Media Experience before *and* after the Experiment—Survey-Based Outcomes

The Waiting and Planning interventions successfully and consistently reduced young consumers' social media activity throughout the intervention period. To examine its effect on participants' subjective experience with social media, both good and bad, an analysis was run on changes in six self-reported constructs that were measured before the baseline phase and at the end of the intervention phase. These constructs were as follows: social media overuse[47], satisfaction with social media, perceived self-control, well-being, social connection, and fear-of-missing out (FOMO).[48]

As outlined in Box **4.2**, each outcome was modeled individually for each intervention group by comparing survey responses obtained from the participants before the baseline phase and after the intervention phase.

The results indicated that participants' self-reported experiences remained largely consistent across all three groups. Thus, the interventions, though successful in reducing participants' social media activity, did not affect participants' subjective experience of using social media in general or related social or emotional effects.

The only measure that changed as a result of the intervention was experienced overuse, which dropped modestly for participants in the Waiting group (*Estimate* = –0.239, *SE* = 0.103, *z* = –2.31, *p* = 0.024), suggesting that the Waiting intervention may have improved the participants' sense of control over their social media consumption. No such change was observed in the Planning (*Estimate* = 0.072, *SE* = 0.107, *z* = 0.67, *p* = 0.502) or Reflection group (*Estimate* = –0.040, *SE* = 0.109, *z* = –0.37, *p* = 0.714). No other statistically significant difference was observed for the remaining outcomes. (Please refer to the technical appendix section 6 for the regression table.)[49]

Subjective Feedback and Experience Ratings

Only 5% of participants in the Planning group and 10% in the Waiting group described the experience of participating in the experiment as negative, while 71% and 56%, respectively, reported it as being a positive experience. The other participants judged the experience as neutral.

Negative feedback primarily centered on the frustration of delayed access to social media, especially when participants wanted to respond quickly or share content in social situations. One participant in the Waiting group noted that, "*It was stressful that I could not access [social media] faster*." Similarly, a Planning group participant reflected, *"It was a bit annoying when you just quickly wanted to check or reply to someone. Other than that, I've also saved a lot of time because I didn't bother doing it all over again, and that's been good because I often find it hard to close social media once I'm there."*

However, even among critical responses, many participants acknowledged some beneficial effects of the experiment. One Waiting group participant remarked, *"It was really annoying that I*

[47] Perceived overuse (retention) is a total score of five questions (Q11-Q16 in the technical appendix section 1), Q14 is reverse scored. The measure is similar in framing, response structure and construct to that collected in the DCCA report: Young Consumers and Social Media (2025).

[48] See technical appendix section 1 for details about these constructs.

[49] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

constantly had to take a deep breath, but at the same time it also really helped me a lot. I feel like I have used social media much less."

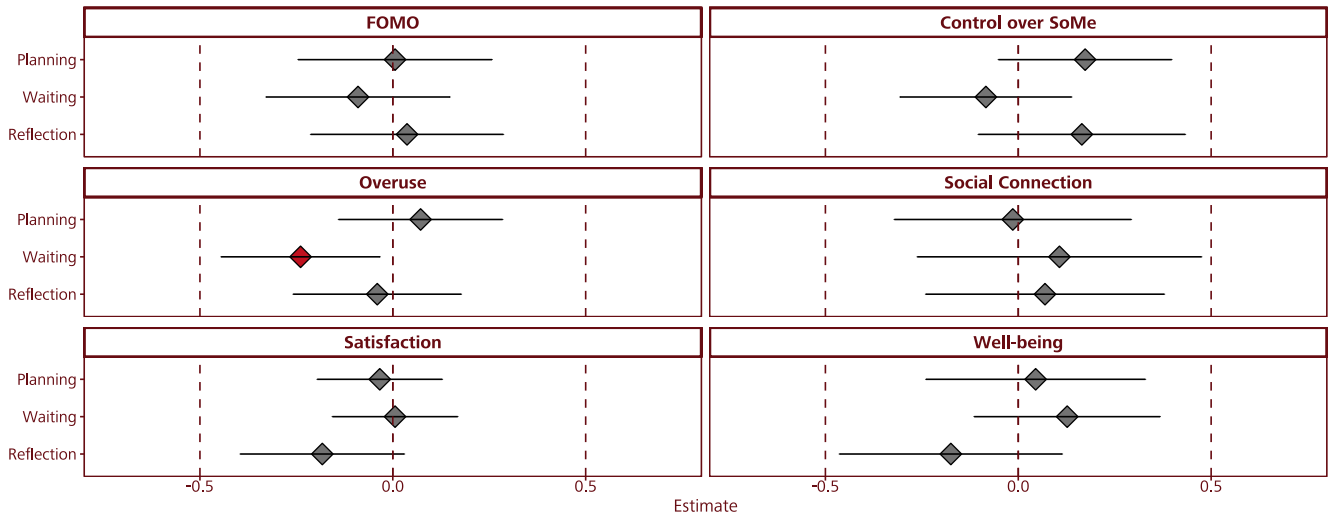
Participants who rated the experience as positive often described gaining greater self-awareness and an increased ability to reflect on their habits with respect to using social media. A Planning group participant stated, *"It's been good because I listened to what it said, and that really made a difference."* Another added, *"I feel that the things [in the app] stopped me from using it unless it was necessary."*

Several participants became more mindful of their motivations for using social media. As one Waiting group participant spoke, *"I've definitely become aware of when I used the apps as a way to procrastinate, out of boredom, or something else—precisely because there was a 6-second delay before you could move on, and during that time you had a moment to just breathe. An awesome experience. It really makes you aware."*

Although no statistically significant improvements in well-being or perceived self-control were observed through surveys, some participants reported notable behavioral changes. One Planning group participant shared, *"I've spent much more time with friends and have become more creative."* Others expressed a mix of appreciation and relief. *"I thought it was fun to test the app, but I am also happy that it's over now."* (Waiting group participant).

These findings indicate that although the interventions changed behavior, they did not significantly disrupt participants' relationship with social media. Figure 4.14 summarizes these results, including point estimates and confidence intervals across various conditions and outcomes.

Figure 4.14 **Estimated Changes from Baseline Survey to Follow-Up Survey in terms of Perceived Self-Control, Social Media Overuse, Satisfaction, Well-Being, Social Connection, and FOMO for the Three Intervention Groups**



Note: Estimated changes are depicted in survey outcomes from baseline survey to follow-up survey across interventions. Each point represents the estimate from a linear mixed-effects model with a 95% confidence interval. Outcomes are shown across the following six aspects: FOMO, control over SoMe, overuse, social connection, satisfaction, and well-being. Rows represent the different intervention groups (Planning, Waiting, Reflection).

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Box 4.2
Modeling Changes in Survey Outcomes before and after Implementing the Interventions

To evaluate how participants' experiences and perceptions changed as a result of the interventions, self-reported survey responses were analyzed using linear mixed-effects models. Responses were collected at two time points: the first survey (pre-baseline) and the second survey (post-intervention). Each model estimated change in psychological outcomes over time, controlling for individual-level variation.

Separate models were fit for each of the three experimental groups (Reflection, Planning, and Waiting) and for each of the six self-reported constructs of interest:

- Perceived control over social media use
- Perceived overuse of social media
- Satisfaction with one's own use of social media
- General well-being
- Social connection
- Fear of missing out (FOMO)

Each outcome was modeled using a linear mixed-effects framework. The primary predictor of interest was survey wave, coded as a binary factor (0 = before, 1 = after). A random intercept was included for each participant to account for repeated measurements. No additional covariates were included, to isolate the within-participant change over time.
The model can be formally expressed as:

$$\textbf{Survey Outcome}_{i,t} = \beta_0 + \beta_1 \textbf{Wave}_{i,t} + \mathbf{Z}_i\boldsymbol{\beta} + \mathbf{u}_i + \boldsymbol{\varepsilon}_{i,t}$$

In this specification:

- Survey Outcome $_{i,t}$ denotes the self-reported score for participant *i* at time *t*.
- The term β_1 represents the coefficient estimating the average change in that outcome between pre- and post-intervention within a given condition.
- u_i is a participant-specific random intercept capturing baseline trait variability.
- $\varepsilon_{i,t}$ denotes residual error.

This model structure was applied identically across all outcomes and conditions to facilitate comparability. Each combination of outcome and intervention group was analyzed in a separate model.

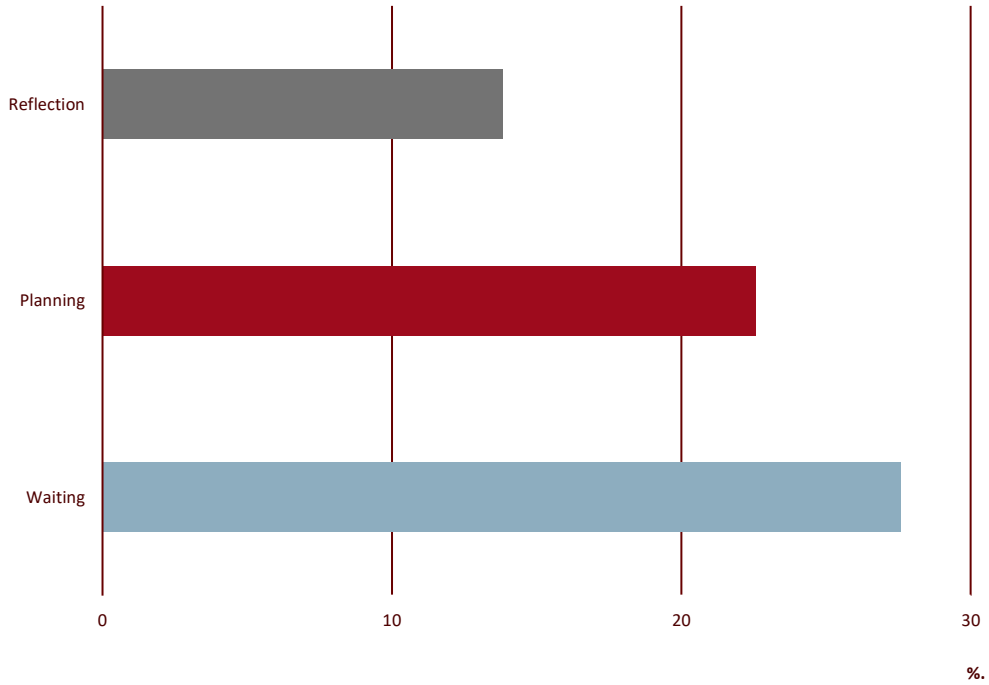
4.10 Intervention Effects: Dismissals

This section examines *dismissals*, meaning instances in which participants opted out of engaging in a social media activity. The intervention design allowed participants in the Reflection group to dismiss a session every fifth time they attempted to open the app, while participants in the Waiting and Planning groups were given the option to dismiss at every session. The analysis considers only those cases in which dismissal prompts were actively given. In addition, participants in the Planning group, who reached their estimated time limit, were given an additional opportunity to either dismiss the session or provide a new estimate in terms of time limit. These reintervention cases are excluded from the first part of the analysis to maintain comparability across conditions but will be addressed later in the section.

Dismissals – Descriptive Results
The rate of opportunities and the rate at which users actually dismissed their social media sessions varied across interventions. In the Reflection group, where dismissal prompts were displayed for every fifth session, the participants had the fewest dismissal opportunities (*n* = 37,317) and the dismissal rate was also the lowest at 13.8%. In contrast, the Waiting and Planning groups, which received a prompt at every app-opening instance, had more dismissal

opportunities (n = 76,922 and n = 94,849, respectively) and also higher dismissal rates—27.6% for the Waiting group and 22.6% for the Planning group (Figure 4.15).

Figure 4.15 **Probability of Dismissal Based on Intervention Group**



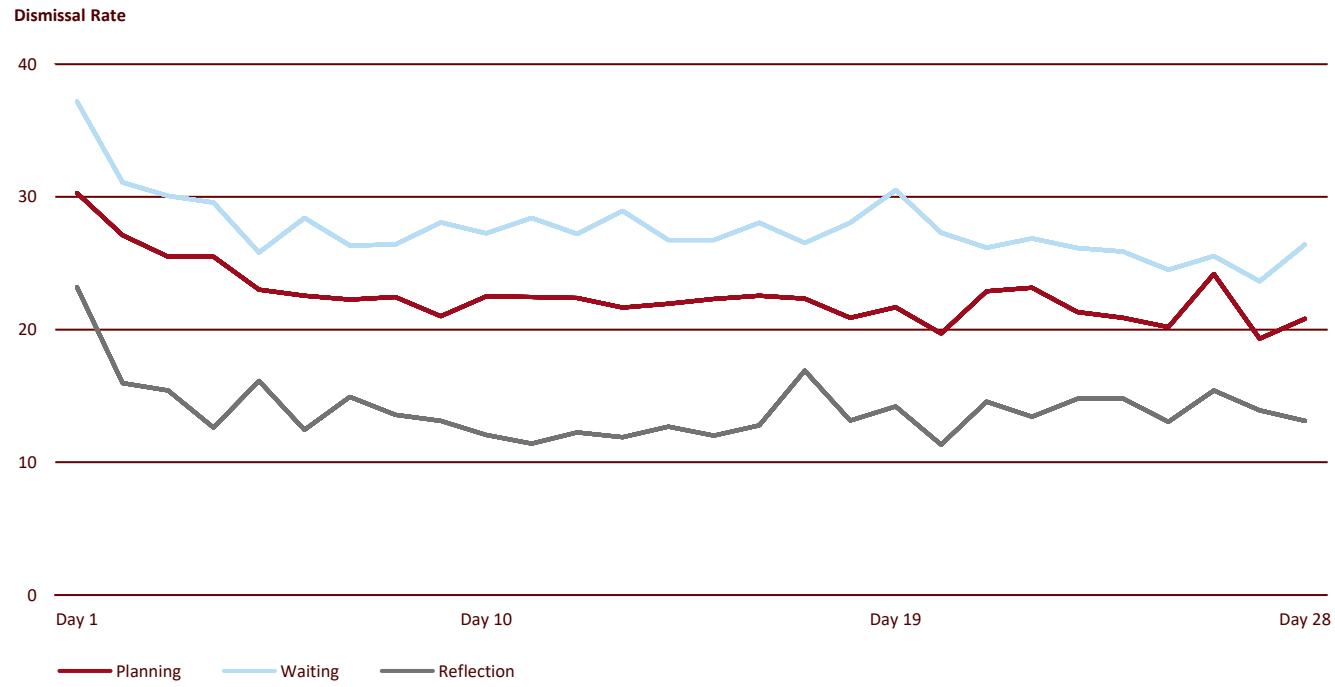
Notes: The figure displays the overall probability of dismissal for each experimental condition: Reflecting, Planning, and Waiting. Horizontal bars represent dismissal probabilities, shown as percentage on the x-axis ranging from 0-30%. The Waiting group is represented in blue, the Planning condition in red, and the Reflection group in grey. Bars are ordered vertically from highest to lowest dismissal probability.

Source: Danish Competition and Consumer Authority's Field Experiment, 2024.

These group-level differences were validated in a logistic mixed-effects model (see Box **4.3**). Compared to the Reflection group, participants in the Planning and Waiting groups (*Estimate* = 0.75, *SE* = 0.12, z = 6.267, $p < 0.001$) and (*Estimate* = 1.00, *SE* = 0.122, z = 8.182, $p < 0.001$) were significantly more likely to dismiss an opportunity for social media engagement. The results indicated that both the Planning and Waiting interventions effectively increased the likelihood of instances in which participants would opt out of a social media engagement opportunity instead of continuing when prompted, with the waiting prompt being somewhat more effective. Notably, the dismissal option in the Waiting condition became available only after the 6-second delay. This was important, because it indicated that participants did not merely dismiss sessions to evade the delay. Instead, the delay appeared to have allowed participants to reassess their preference for engaging with social media at that moment.

Figure 4.16 shows the average daily dismissal rate over the 28-day intervention period for each of the groups. In all three of these, dismissal rates peaked on the first day, and then stabilized at slightly lower rates throughout the rest of the phase.

Figure 4.16 **Daily Dismissal Rate Based on Intervention Group Across the Intervention Period**



Note: The figure shows the average daily dismissal rate across 28 days of participation in the intervention period for each experimental condition. The Waiting condition (red) consistently produced the highest dismissal rates, followed by the Planning condition (blue), while the Reflection condition (grey) showed the lowest rates. All three groups exhibit a similar pattern: high initial dismissal rates on day 1 followed by a gradual decline over time. This trend suggests decreasing responsiveness to prompts as participants progressed through the study.

Source: Danish Competition and Consumer Authority's Field Experiment, 2024.

Temporal Distribution of Dismissals

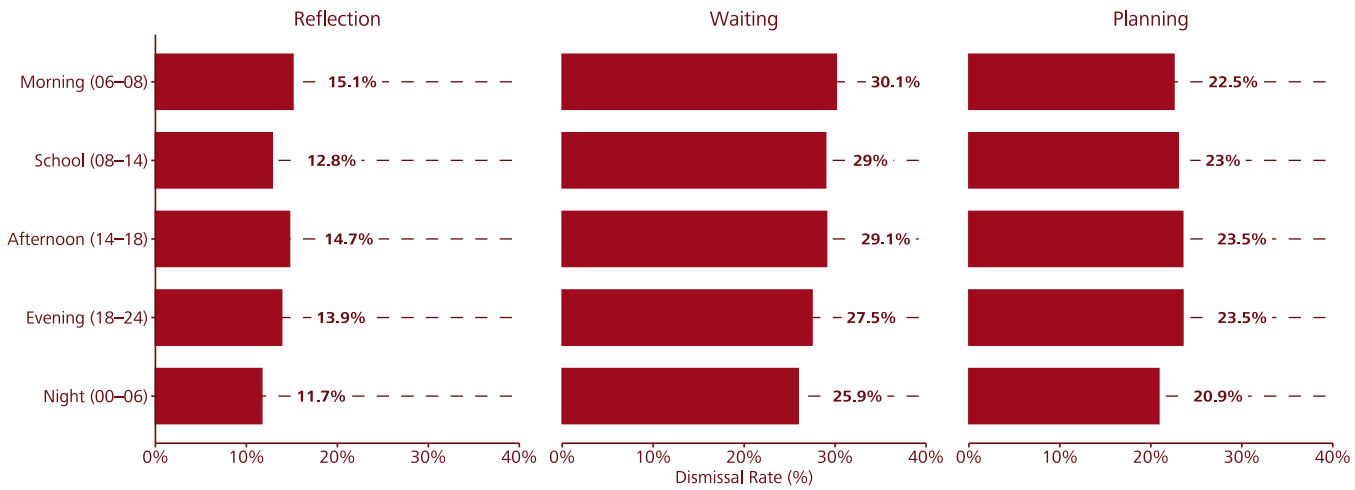
Dismissal rates varied systematically across time of day and between weekdays and weekends (Figure 4.17 and Figure 4.18). On weekdays, dismissals were most frequent in the early morning hours (06:00–08:00), averaging 24.3%, and progressively declined throughout the day: 23.4 % during school hours (08:00–14:00), 24.0% in the afternoon (14:00–18:00), 23.2% in the evening (18:00–24:00), reaching the lowest level at night (00:00–06:00) at 21.5%.

Weekend patterns followed a similar structure, albeit at a lower intensity. The highest dismissal rate was observed during the night (00:00–06:00; 23.6%), followed by the evening (22.5%), afternoon (22.3%), and school hours (21.8%). The lowest rate was recorded during the weekend morning window (06:00–08:00) at only 17.5%.

These dynamics are visualized for the various intervention groups in Figure 4.17 and Figure 4.18.

Dismissal patterns indicate that more friction (e.g., as found in the Waiting intervention) increased the likelihood of instances in which participants reevaluated their preference for social media activity in contexts that required greater attention (i.e., weekday mornings and school hours). The Planning group consistently maintained dismissals across time windows, while the Reflection group showed fewer dismissals overall.

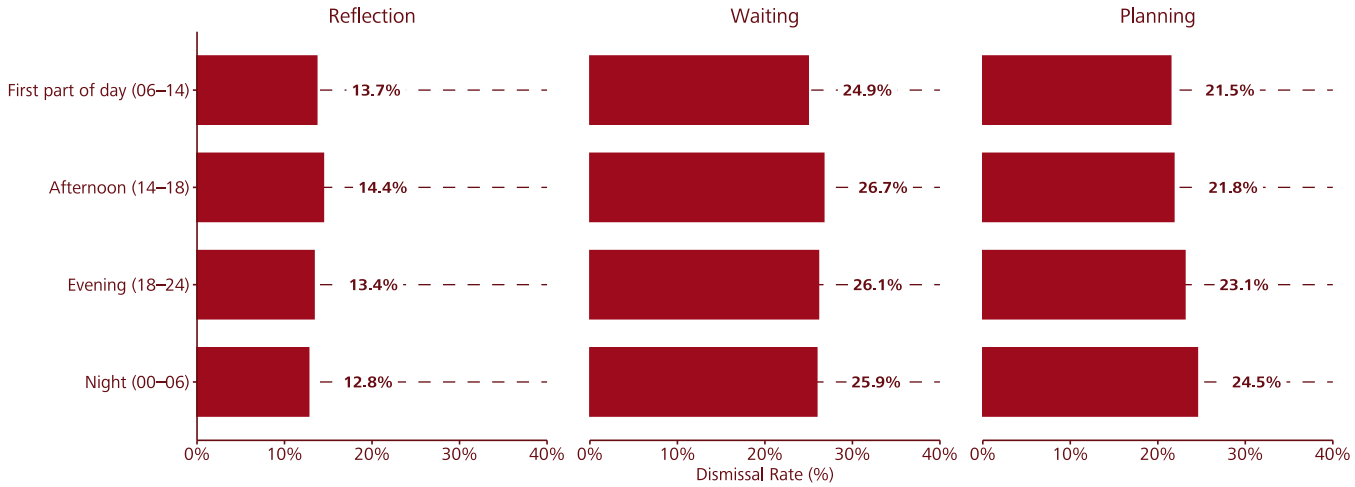
Figure 4.17 **Dismissal Rate (in percent) Based on Groups and Weekday Time Windows**



Note: This figure shows dismissal rates on weekdays across five time slots—morning (06:00–08:00), school (08:00–14:00), afternoon (14:00–18:00), evening (18:00–24:00), and night (00:00–06:00)—for each intervention (Reflection, Planning, Waiting). Observations from the Fall and Christmas break periods are excluded from the averages.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Figure 4.18 **Dismissal Rate (in percent) Based on Groups and Weekend Time Windows**



Note: This figure displays dismissal rates during weekends across four time slots—first part of the day (06:00–14:00), afternoon (14:00–18:00), evening (18:00–24:00), and night (00:00–06:00)—for each experimental condition (Reflection, Planning, Waiting). Observations from the Fall and Christmas breaks are excluded from the averages.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Temporal and Contextual Effects on Dismissals

The likelihood of dismissals varied significantly depending on various times and contexts. They were slightly less common on weekends (22.0%) compared to weekdays (23.2%), which represents a statistically significant difference (*Estimate* = –0.061, *SE* = 0.012, *z* = –4.917, p < 0.001). A similar pattern was observed during the Fall break, when the dismissal rate dropped

to 19.91% from a weekday average of 23.1% (*Estimate* = –0.145, *SE* = 0.028, *z* = –5.212, p < 0.001), suggesting that participants were less likely to resist starting a social media session during periods characterized by fewer external constraints.

Dismissal rates varied slightly in terms of educational context, although none of the differences among school types achieved statistical significance. Rates of dismissals ranged from 24.1% among participants in primary education to 20.3% among those attending boarding schools.

The specificity of a social media platform also had a strong effect on the participants' tendency to dismiss sessions. Relative to TikTok (22.6% dismissal rate), dismissal was significantly more likely for Instagram (24.6%; *Estimate* = 0.159, *SE* = 0.019, *z* = 8.377, p < 0.001) and Facebook (23.5%; *Estimate* = 0.280, *SE* = 0.036, *z* = 7.721, p < 0.001). Dismissals were also slightly more likely for Snapchat (22.6%; *Estimate* = 0.040, *SE* = 0.015, *z* = 2.669, *p* = 0.008), despite its dismissal rate similar to that of TikTok (22.6%), suggesting small but statistically meaningful differences when controlling for time trends and participant-level variance.

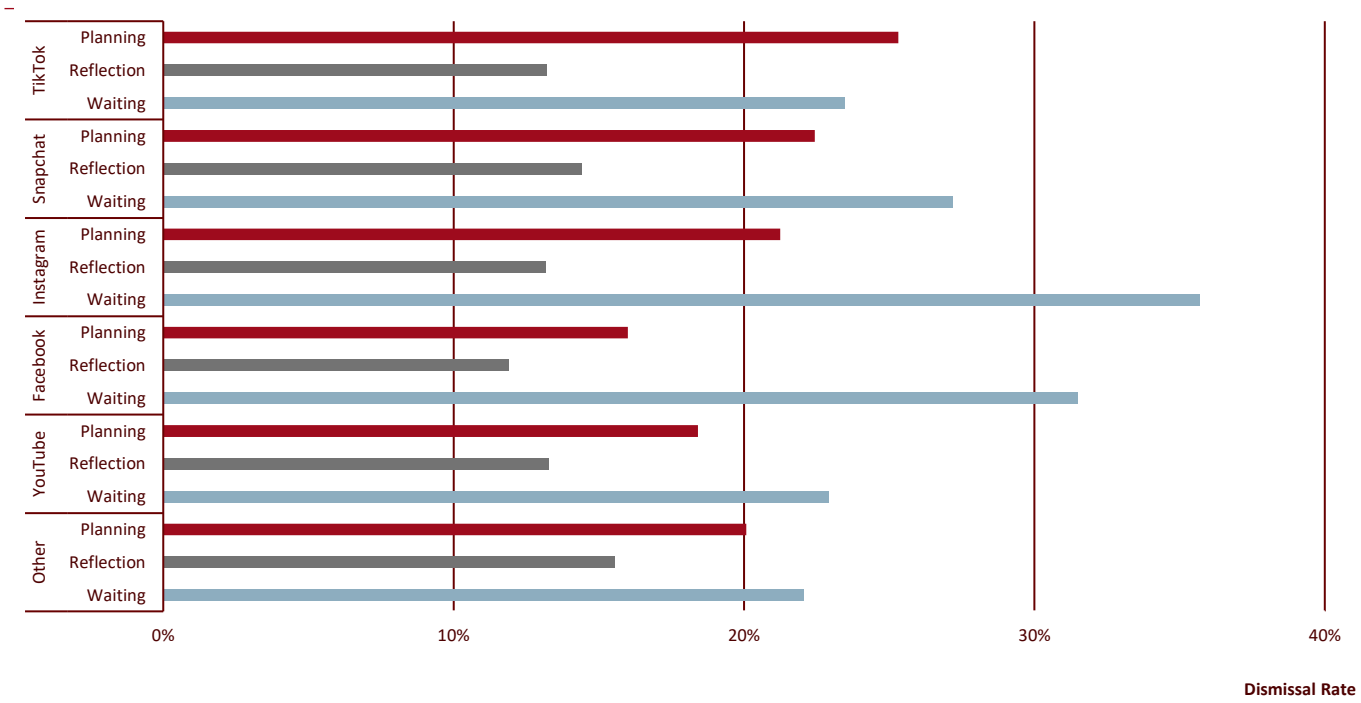
No significant difference was detected between participants' dismissals for TikTok and YouTube (p = 0.825). However, the "Other" category—which included less frequented platforms such as Reddit, LinkedIn, Pinterest, and Twitter—was associated with a significantly lower dismissal rate compared to that of TikTok (*Estimate* = –0.131, *SE* = 0.054, *z* = –2.450, *p* = 0.014), which indicates that participants are more deliberate rather than habitual in the use of these platforms. Please refer to the technical appendix the regression results in terms of temporal, educational and platform effects on participants' dismissal behavior.[50]

Intervention Type and App-Specific Dismissals

Dismissal probabilities varied significantly across platforms and interventions, highlighting platform-specific dynamics in user responses to various intervention strategies. Figure 4.19 shows the average dismissal rate on the basis of app and condition, highlighting unique interactions between interventions and apps.

Figure 4.19 **Probability of Dismissal Based on Social Media Platforms and Experimental Groups**

[50] DCCA (2025): Disrupting Social Media Habits - Technical Appendix



Note: This figure shows the average probability of dismissing an app-opening prompt across six platforms—TikTok, Snapchat, Instagram, Facebook, YouTube, and Other—broken down by experimental group: Planning (dark red bars), Waiting (blue bars), and Reflection (grey bars). Each set of horizontal bars represents dismissal probabilities for a given platform. The x-axis ranges from 0 to 40%, and vertical lines provide visual benchmarks.

Source: Danish Competition and Consumer Authority's Field Experiment, 2024.

Therefore, although the Waiting interventions resulted in more dismissals on most platforms, TikTok stands out as a notable exception. One possible explanation for this is its nature of engagement: TikTok is typically associated with longer, more immersive sessions, which may make users more receptive to planning-related cues that emphasize temporal aspects. In contrast, platforms with brief check-ins—such as Snapchat or Instagram—seem to be more affected by short-term disruptions, such as waiting.

Box 4.3
Modeling Session Dismissals

This model estimates the likelihood that a participant dismisses a social media session after receiving a prompt—interpreted as a moment of disengagement or a behavioral expression of immediate digital regret. The analysis was restricted to sessions in which a dismissal prompt was presented. For comparability, dismissal opportunities triggered by time-limit reinterventions in the Planning condition were excluded from the primary analysis and examined separately.

The presence of dismissal prompts varied by experimental condition. In the Reflection group, participants were prompted every fifth time they opened an app. In contrast, participants in the Waiting and Planning groups received a prompt at the start of every session. This structural difference resulted in large between-group variation in the number and frequency of dismissal opportunities, as well as in observed dismissal rates.

To estimate the probability of session dismissal, a logistic mixed-effects model was specified, with a binary outcome indicating whether a session was dismissed (1) or not (0). The key predictor was experimental condition (Reflection, Waiting, Planning), allowing for comparison of dismissal rates across intervention groups.

To accommodate potential nonlinear change in dismissal behavior over time, the number of days since the start of the intervention was modeled as a natural spline with two degrees of freedom. This captured any temporal drift, learning, or habituation during the 28-day study period.

A participant-level random intercept was included to account for repeated observations and between-subject variability. The full model specification was as follows:

$$Dismissed_{i,t} = \beta_0 + \beta_1 Condition_i + \beta_2 f(Time_{i,t}) + \mathbf{Z_i}\beta + u_i + \varepsilon_{i,t}$$

In this specification, the binary outcome $\boldsymbol{Dismissed_{i,t}}$ indicates whether session t by participant i was canceled at the prompt. The term $\boldsymbol{\beta_1}$ captures differences in dismissal likelihood between experimental conditions. $\boldsymbol{\beta_2 f(Time_{i,t})}$ represents natural splines (df = 2) to model nonlinear time effects. $\mathbf{Z_i\beta}$ includes the set of control variables described below. The random intercept $\mathbf{u_i}$ captures participant-level heterogeneity in baseline dismissal propensity, and $\boldsymbol{\varepsilon_{i,t}}$ is the residual error.

The model included the following control variables:

» Educational track (primary education, secondary education, boarding school, and other)
» Geographic region (Capital Region as reference, compared to Mid Jutland, Northern Jutland, Zealand, and Southern Denmark)
» Weekend indicator (0 = weekday, 1 = weekend)
» Fall break indicator (0/1)
» App (TikTok, Snapchat, Instagram, Facebook, YouTube, Other)

This model structure enabled estimation of differences in dismissals between experimental conditions while adjusting for individual, temporal, contextual, and platform-related factors.

4.11 Reinterventions: Persistence in App Use after Self-Imposed Time Limits

In the Planning condition, participants were instructed to set a time limit at the beginning of each session. When this threshold was reached, a second prompt—called a reintervention—was presented to them, offering to either dismiss or proceed with a new time limit. This section examines participants' responses at the following two stages: the initial prompt and the subsequent reintervention

Frequency and Resolution of Reintervention Events
In the Planning group, a total of 97,742 initial intervention prompts were recorded, with 75,732 resulting in app-opening instances and 22,010 in dismissals. This reflects a dismissal rate of 22.5%. In contrast, there were 7,675 recorded reintervention prompts, of which 3,339 were dismissed and 4,336 led to continued sessions. This results in a significantly higher dismissal rate of 43.5% indicating that participants were more likely to disengage once they reached their self-imposed time limit.

App-specific differences in planning behavior—such as preferred time limits and the likelihood of hitting those limits—varied considerably across platforms. For example, TikTok and YouTube were often associated with longer planned sessions, while Snapchat and Instagram

leaned toward shorter limits. These platform-specific planning patterns, including time limit distributions and continuation rates, are reported in detail in the technical appendix.[51]

At the reintervention stage, TikTok and Instagram stood out again as the platforms with the highest dismissal rates. TikTok reinterventions resulted in dismissals for 44% of the time (1,406 of 3,199), while Instagram's reintervention dismissal rate reached 44.3% (693 of 1,563). Snapchat (43.6%) and YouTube (39.8%) followed closely. Overall, this suggests that reintervention mechanisms were triggered infrequently, occurring in approximately 10% of potential sessions. However, when they were triggered, the likelihood of disengagement significantly increased.

Across all sessions, participants used an average of 27.2% of their planned time, indicating that most users disengaged long before reaching their self-imposed limit and that merely a simple act of setting a time goal can increase participants' sensitivity to the time spent during the session. Further details—including time-setting distributions, app-specific planning profiles, reintervention frequency by platform, and dismissal rates—are presented in the technical appendix.[52]

4.12 Intervention Effects on Potential Sleep Duration

To evaluate how the interventions affected participants' potential for sleep, daily sleep was estimated through a behavioral proxy based on participants' social media activity. The proxy estimated sleep duration by calculating the time between a participant's last app interaction in the evening and their first interaction the next morning.

The analysis examines whether the estimated sleep duration changed with the introduction of the interventions. As outlined in Box 4.4, a generalized linear mixed-effects model was employed to evaluate condition-specific changes over the study period, controlling for time trends, demographic background, and contextual factors. The median estimated sleep duration for the sample was 9 hours. The technical appendix section 6 presents the regression results in detail.[53]

Participants in both the Planning- and Waiting interventions exhibited a statistically significant increase in their estimated sleep throughout the intervention phase. In the Planning condition, participants gained an average of 0.275 hours of additional potential sleep compared to the baseline period (*Estimate* = 0.230, *SE* = 0.072, $z = 3.21$, $p = 0.0013$), corresponding to approximately 16 minutes and 30 seconds[54]. In the Waiting group, the increase was 0.247 hours (*Estimate* = 0.203, *SE* = 0.072, $z = 2.82$, $p = 0.0048$), or about 14 minutes and 48 seconds[55] in total from baseline to intervention. These findings suggest that both interventions produced modest but considerable improvements in digital disengagement prior to or at bedtime (see Figure 4.20).

[51] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

[52] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

[53] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

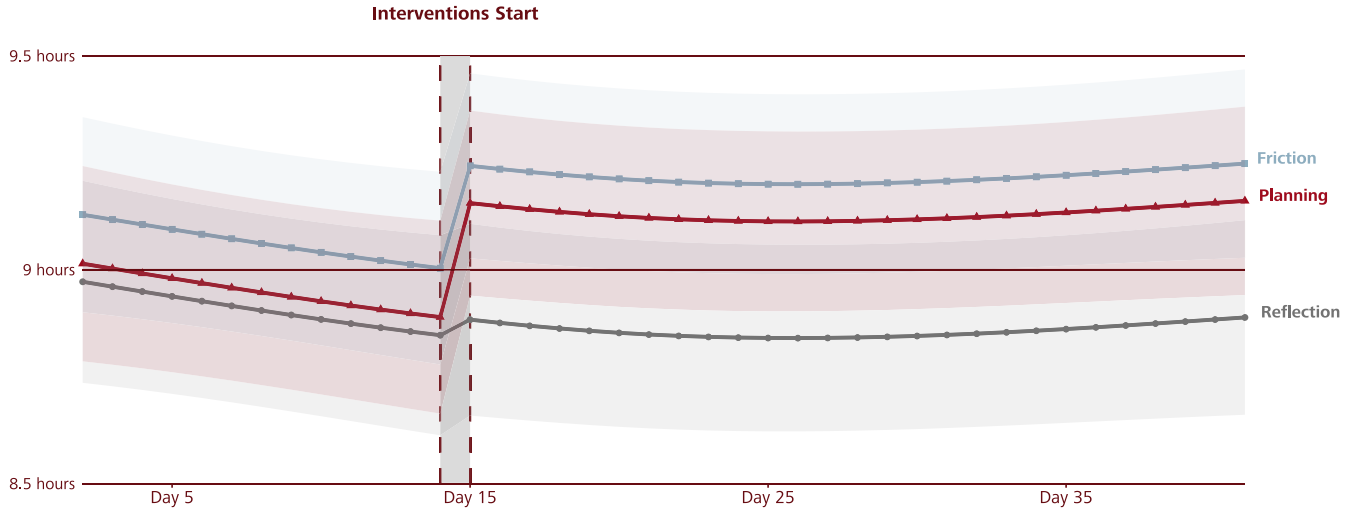
[54] The total increase of 0.275 hours (16 minutes 30 seconds) reflects the interaction effect for Planning (0.230 hours) added to the baseline change in the Reflection group (0.044 hours).

[55] The total increase of 0.247 hours (14 minutes 48 seconds) reflects the interaction effect for Waiting (0.203 hours) added to the baseline change in the Reflection group (0.044 hours).

In contrast, the Reflection group did not exhibit a significant change in potential sleep duration (*Estimate* = 0.044, *SE* = 0.079, *z* = 0.561, *p* = 0.575), indicating that low-friction reflection prompts did not impact nighttime social media activity in a similar way.

The model-estimated trajectories of sleep duration are shown in Box 4.4. The figure illustrates that the Reflection group's potential sleep remained stable from baseline into the intervention phase, while both the Planning and Waiting groups exhibited distinct increases in sleep immediately after the beginning of their respective interventions. These stable, phase-consistent patterns support the conclusion that the interventions led to lasting changes in participants' sleep-related behavior.

Figure 4.20 **Model-Estimated Sleep Trajectories Based on Experimental Groups across the Experimental Period**



Note: This figure illustrates the model-estimated daily sleep duration (in hours) across the experimental timeline for each experimental group—Reflection (gray line), Planning (red line), and Waiting (blue line). Solid lines indicate predicted values from the model, while shaded ribbons represent 95% confidence intervals. The gray-shaded area between Day 14 and Day 15 indicates the transition from baseline to intervention, with vertical dashed lines showing the boundary. Due to the exclusion of the first day in each period, predictions began at Day 2.

Source: The Danish Competition and Consumer Authority's Field Experiment, 2024-2025.

Notably, no baseline differences were observed in sleep duration between groups, which added to the causal interpretation of intervention-related improvement in potential sleep. Estimated sleep during the baseline phase was not statistically different among the three groups (see Technical appendix section 6 for regression details).[56]

Additional covariate effects revealed that participants in secondary education slept significantly less than those in primary education (*Estimate* = –0.801, *SE* = 0.157, *z* = –5.105, p < 0.001). Weekend nights were associated with significantly longer sleep duration (*Estimate* = 0.131, *SE* = 0.031, *z* = 4.231, p < 0.001), as was the Fall break (*Estimate* = 0.613, *SE* = 0.051, *z* =

[56] DCCA (2025): Disrupting Social Media Habits - Technical Appendix

12.12, $p < 0.001$), reflecting sleep extensions during periods of reduced scheduling constraints.

Box 4.4
Modeling Intervention Effects on Estimated Sleep Duration

Estimated sleep duration was inferred using a behavioural proxy derived from participants' app activity logs. For each participant-day, the time of the last recorded social media use in the evening was treated as the estimated time of sleep onset, and the time of the first recorded use the following morning as the estimated wake time. To better approximate typical circadian rhythms and avoid misclassification due to late-night usage, any app activity between 00:00 and 04:00 was reassigned to the previous calendar day.

Daily sleep opportunity was computed as the interval between these two timestamps. Values shorter than 4 hours or longer than 14 hours were excluded to remove outliers, data errors, and irregular logging patterns. The first and last recorded days for each participant were also excluded to avoid artifacts from partial tracking.

The outcome—estimated sleep duration in hours—was modelled using a linear mixed-effects model. Although the variable was continuous and strictly positive, visual inspection confirmed that its distribution did not require a non-linear transformation or specialized link function. This model structure was chosen for its straight forward interpretability.

As in Box 4.1, the analytic framework followed an interrupted time-series design, enabling the estimation of condition-specific changes in sleep following the introduction of the intervention. The key term of interest was the interaction between period (baseline vs. intervention) and condition (Reflection, Waiting, Planning), capturing changes in estimated sleep duration over time by experimental group.

The model was specified as:

$$\text{Sleep}_{i,t} = \beta_0 + \gamma_1(\text{Period}_{i,t} \cdot \text{Condition}_i) + \gamma_2 f(\text{Time}_{i,t}) : \text{Condition}_i + \mathbf{Z_i}\beta + u_i + \varepsilon_{i,t}$$

In this formulation, $\mathbf{Sleep}_{i,t}$ denotes the estimated hours of sleep for participant *i* on day *t*. The interaction term $\boldsymbol{\gamma_1}$ represents a set of coefficients estimating whether sleep duration changed after the intervention began and whether those changes differed between experimental groups. The term $\boldsymbol{\gamma_2}$ captures time trends using natural splines with two degrees of freedom, flexibly modelling potential drift over time. $\mathbf{Z_i\beta}$ represents the full set of control variables. A random intercept $\mathbf{u_i}$ accounts for repeated observations within participants, and $\boldsymbol{\varepsilon_{i,t}}$ denotes residual error.

The following control variables were included and are a part of $\mathbf{Z_i}$:

- Educational track: primary education (reference), secondary education, boarding school, and other
- Gender: binary indicator (male or female)
- Region: Capital Region (reference), compared to Mid Jutland, Northern Jutland, Zealand, and Southern Denmark
- Weekend: binary indicator (1 = weekend, 0 = weekday)
- Fall break: binary indicator for whether the observation occurred during the fall holiday

Chapter 5
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