Andrade (doodling)

simplypsychology.org/andrade-doodling.html

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> Andrade, J. (2010). What does doodling do?. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, *24*(1), 100-106.

Psychology Being Investigated

The psychology investigated in the Andrade study focuses on the cognitive processes of **attention and memory** and how doodling affects them.

Doodling

Doodling is the act of drawing pictures or patterns while thinking about something else or when bored.

It is a form of aimless sketching. Doodling is typically spontaneous and automatic.

It is often done absent-mindedly, without much conscious effort.

Daydreaming

Daydreaming involves being lost in thought, often with a sense of detachment from one's material surroundings.

It is a state where attention is not focused on any particular external task.

Daydreaming is considered a distraction that diverts attention away from the primary task.

When someone is daydreaming they are usually not able to pay attention to a lecture or other task.

Working memory

The working memory model proposes separate components for processing visual and auditory information.

These components allow the brain to temporarily hold and manipulate information from these different senses which suggests separate visual and auditory memory systems.

The study uses an auditory task (listening to a phone message) and a visual task (doodling) to investigate how these systems interact.

Dual-task design

A dual-task design requires participants to engage in two tasks concurrently. The goal is to observe how performing one task affects the performance of the other.

Dual-task designs are used to study **divided attention**, where mental effort is split between two or more tasks.

Typically, there's a **primary task**, which is the main task the participant is supposed to focus on.

The secondary task is the **concurrent task**, which is done simultaneously with the primary task.

In the Andrade study, the primary task was monitoring a telephone message, and the concurrent task was doodling.

Arousal

Arousal is a state of being awake or reactive to stimuli. It can be seen as the level of alertness or activation that an individual experiences.

The Andrade study questions whether doodling helps to maintain or reduce arousal levels, thus improving focus.

It posits that doodling can help regulate arousal; it can help calm someone who is agitated, and keep someone awake who is feeling sleepy.

Background

Daydreaming has been linked to moments of boredom in people, and that in such situations, people may resort to doodling to help concentration.

It has also been assumed that doing concurrent tasks, such as doodling, impairs concentration or distracts from a primary task.

However, the effects of boredom on processing have been overlooked.

The researchers also considered the role of arousal, noting that arousal levels need to be maintained to be able to concentrate.

The study also took into account the fact that information processing can be difficult when asked to do multiple things at once.

The researchers used a dual-task design to pinpoint cognitive resources.

Aims

- To investigated whether doodling aids concentration or memory.
- To investigate if doodling affects the recall of places and names.
- To test the effects of doodling on a boring or mundane task.

Method

Sample

The participants were recruited from a **university** and were between the ages of **18 and 55 years**.

The sample was **40 participants** who were members of the Medical Research Council of the Applied Psychology Unit.

The study had a gender imbalance, with a higher number of female (35) participants than male (5).

In each experimental condition, there were 20 participants.

- 18 females and 2 males were in the **control** group.
- 17 females and 3 males were in the doodling (**experimental**) group.

The participants were a volunteer sample and were recruited after completing another, unrelated study at the same research facility.

One participant in the doodling group was replaced because they did not doodle.

Design

Andrade conducted a well-controlled **laboratory experiment** to investigate how doodling affects memory and attention.

The study used an **independent measures design**, meaning that participants were randomly allocated to either the doodling group or the control group.

The study used a dual-task design in which participants were asked to perform a primary task of monitoring a phone call while simultaneously either doodling or not doodling.

This was done to assess the impact of doodling on attention and memory.

Independent variable

The independent variable was the act of doodling, which had two levels: the **doodling condition** where participants shaded in shapes, and the **control condition** where participants did not doodle.

The IV was manipulated by providing different materials to the two groups: one group was given paper with shapes to shade in, and the other group was given lined paper.

Doodling was operationally defined as shading in printed shapes on a response sheet. This was done to ensure that the doodling task did not require too much attention and was easily measurable.

Dependent variable

The dependent variable was the participants' **memory and attention performance**, measured through a monitoring task and a surprise recall test.

This was measured quantitatively by calculating the number of correct names and places recalled, minus any false alarms.

Procedure

Participants were recruited just after they had completed another study, to ensure they would be more inclined to be bored.

Participants were randomly assigned to one of two conditions:

- **Doodling Group**: Participants were given an A4 sheet of paper with alternating rows of 10 squares and circles, each about 1 cm in diameter. They were instructed to shade in the shapes while listening to the message and were told this was to relieve boredom, with no emphasis on neatness or speed. They were also given a 4.5 cm margin on the left side of the paper to write down the names.
- **Control Group**: Participants were given a standard A4 sheet of lined paper and a pencil. They were not given any doodling instructions.

Monitoring Task

Participants listened to a **pre-recorded, monotonous telephone message** for 2.5 minutes.

The message included names of eight people attending a party, three people (and one cat) not attending, and eight place names.

The message was recorded on an audio cassette and played at 227 words per minute.

While listening, participants were instructed to **write down the names of people** who would be attending the party.

The control group wrote these names on lined paper, while the doodling group wrote them in the maegin on a sheet of paper with shapes to shade in.

Surprise Recall Task

After the telephone message, participants were given a surprise memory test. They were not informed about this test beforehand

After a minute of conversation with the experimenter, they were asked to recall the names of party-goers or places.

The order of the recall tasks were **counterbalanced** to reduce order effects.

Half of the participants in each group were asked to recall names first, then places, while the other half were asked to recall places first, then names.

Participants were then debriefed and asked if they suspected that the study was a memory test

Data Collection and Analysis

The **number of shapes shaded** by participants in the doodling group was counted.

This was done to ensure that they had followed the instructions to doodle and to measure the extent of their doodling.

The range of the amount of doodling was recorded.

The **number of correct names** noted down, minus any **false alarms** (names of people not attending) was used to assess monitoring performance and the recall task.

Plausible mishearings of names (e.g. “Greg” instead of “Craig”) were counted as correct, provided that the same plausible mishearing was used consistently in the monitoring and recall phases.

Data from participants who suspected a memory test were removed from the analysis to check for demand characteristics.

Results

Doodling Activity

Participants in the doodling group shaded an average of 36.3 shapes on their response sheets, with a range from 3 to 110.

One participant in the doodling group did not doodle and was replaced.

Participants in the control group did not doodle.

Monitoring Task

The doodling group demonstrated significantly better monitoring performance compared to the control group.

- The doodling group correctly wrote down a mean of 7.8 names of party-goers, with one false alarm, leading to a monitoring score of 7.71.
- The control group correctly wrote down a mean of 7.1 names, with five false alarms, resulting in a monitoring score of 6.91.
- This difference was statistically significant, indicating that doodling helped participants concentrate better on the primary task of monitoring the telephone message.

Recall Task

The doodling group also showed superior recall performance compared to the control group.

When recalling names, the doodling group had a mean score of 5.1, while the control group had a mean score of 4.03.

For places, the doodling group had a mean score of 2.4, while the control group had a mean score of 1.83.

When combining the recall of both names and places, the doodling group recalled a mean of 7.5 pieces of information, which was **29% more** than the control group's mean of 5.81….

The recall of names was better than the recall of places for both groups16….

False Alarms

The control group had more false alarms during the recall task (a total of 5) compared to the doodling group (a total of 1), suggesting that doodling may have helped to reduce daydreaming, or mind wandering.

Conclusion

- People concentrate better and their memory is better when allowed to doodle as it focuses their attention and stops them from getting distracted.
- The study notes two possible explanations for why doodling improves recall: that either doodling affects attention, or it improves memory by encouraging deeper information processing.
- However, without measuring daydreaming, it was difficult to distinguish between the two explanations.

Strengths

1. Counterbalancing

Counterbalancing was used to control for order effects with regards to the dependent variable.

Half the participants recalled names first and then places, while the other half recalled places first and then names.

This ensured that the order of the memory recall task did not affect the results

2. Control for Demand Characteristics

The study incorporated a deception where participants were not informed that there would be a memory test.

This was done to ensure that participants did not purposely try to memorize the information.

Additionally, the researchers asked participants about any suspicion of a memory test.

When data from the suspicious participants were removed, the results remained significant, suggesting that demand characteristics did not have a significant effect on the results

3. The study collected quantitative data, so comparisons are easier.

The study primarily collected quantitative data, such as the number of shapes shaded by the doodling group and the number of names and places recalled.

This numerical data allows for easy comparison between the experimental and control conditions.

The use of means, standard deviations and statistical tests all contributed to a robust analysis of the data.

4. The sample was already bored and fatigued, so it was a valid sample.

The study was designed to create a boring condition, which could cause daydreaming.

The researchers recruited participants after they had completed another study to make it more likely they would be bored

Weaknesses

1. Limited Ecological Validity

The study was conducted in a **controlled laboratory setting**.

The tasks involved listening to a monotonous telephone message and shading in shapes, which are not typical of real-life situations where doodling occurs.

This artificiality makes it difficult to generalize the findings to everyday scenarios, such as classrooms, workplaces, or other settings.

Real-world tasks are rarely purely auditory or visual, and people tend to draw shapes and figures while doodling, rather than just shading in pre-printed shapes.

The study's task of monitoring a phone message was also not a common task for people to perform.

2. Sample Bias and Limited Generalizability

The participants were recruited from a medical research panel. This panel may have a specific interests or motivations to be part of the study, so the sample was not very diverse.

The sample was not representative of the general population, There were only 5 males across the two groups, so the findings about concentration and memory may only apply to females.

The age range of 18-55, while broad, might not represent all age groups, further limiting generalizability.

The small sample size of 40 participants also makes it difficult to generalize the findings to a larger population

3. Lack of Measurement of Daydreaming

The study did not directly assess if daydreaming occurred.

This omission makes it difficult to determine whether the improved performance was due to reduced daydreaming, increased attention, or deeper processing.

It would have been helpful to have self-reports of daydreaming or other ways to measure this construct.

4. Participant Variables

Individual differences in the way people doodle and how much they doodle could affect the results.

The range of shapes shaded varied greatly (3-110), which shows that some people doodled much more than others.

This variation could be a confounding variable because the study did not measure or control this.

Some people may have also naturally had better memories than others, affecting the results

Ethics

Deception:

Participants were not fully informed about the true purpose of the study.

They were told they were participating in a study about monitoring a phone message, but were not informed that there would be a surprise memory test at the end.

This **withholding of information** is a form of deception, as the participants were not aware of all aspects of the study.

Justification for deception

The deception was considered **necessary** for the validity of the study.

The researchers had to deceive participants to prevent them from deliberately trying to memorize information, which would have affected the results.

The researchers did try to maintain ethical standards by debriefing and explaining the deception, and also by apologizing for misleading them.

Informed Consent:

Because of the deception, participants did not give **fully informed consent**.

Participants were not given all the information about the study, including the surprise memory test, before agreeing to participate.

This lack of full disclosure violates the ethical principle of informed consent, which requires participants to be aware of the nature of the study, including its purpose, procedures, and any potential risks or benefits before participating.

Psychological Distress:

The study involved a **benign task** that posed no psychological or physical risk to the participants.

The doodling and monitoring tasks were not stressful or harmful, minimizing potential negative impacts on the participants.

Because the task was benign, there was no real risk of harm for the participants.

The surprise memory test may have caused some **psychological distress** to participants.

Some participants might have felt uncomfortable or anxious about being asked to recall information they did not know they would be tested on.

They might have felt they would be judged on their memory performance.

Debriefing:

To mitigate the ethical concerns about deception, the researchers conducted a **debriefing** session at the end of the study.

During the debriefing, the participants were informed of the true aim of the study, and the reasons for the deception.

The researchers **apologized** to the participants for misleading them about the surprise memory test.

Debriefing is a measure to control for the unethical procedure of deception.

Issues and Debates

Application to everyday life: Improved Learning and Engagement

The study's findings suggest that doodling can be integrated into learning strategies to keep students engaged during passive learning activities, such as listening to lectures or watching educational videos.

Educators might encourage doodling as a way to maintain focus, particularly for students who struggle with attention.

Application to everyday life: Reducing Negative Thinking

Doodling may also reduce negative thinking, by occupying the mental resources that would otherwise be spent in negative thoughts.

Application to everyday life: ADHD Management

Doodling may be a practical, non-pharmacological strategy to help manage symptoms of ADHD, as it could provide enough stimulus to prevent distractions and improve focus on a primary task.

Links to the Cognitive Approach

- The cognitive approach is about the way we process information and how our memory works.
- Cognitive psychology examines how our memory works.
- The study explored the way we process information, which is input, process, and output.
- The study tested whether doodling affects memory recall.

- People were able to process information from a telephone message without focusing on it.
- Participants could recall more names when they were doodling, so they could selectively attend.
- The study examined the role of split attention in recall.
- Differences between people can be attributed to individual patterns of cognition.
- The doodling group performed better on the monitoring task, showing that differences between the groups can be explained by cognitions or thinking processes, and that they were dual processing information.
- Doodling allowed access to optimal levels of cognitive processing and reduced daydreaming.

Individual and situational explanations

The study shows how an individual's action (doodling) can change the outcome of a situation (a boring task).

Individual differences

The study may support the individual side of the debate because everyone doodled in different ways, perhaps based on their personality type.

There was a wide variety in the amount of doodles (e.g., someone doodled 100 items).

People who are labelled as extraverts may require to do more than one thing at once to help stimulate themselves and concentrate better.

Different personalities will doodle in different ways.

Situational explanations

The study may support the situational side of the debate because Andrade made sure everyone was bored so the situation caused them to doodle and concentrate more when doodling.

The task itself may have brought about an improvement in concentration as doodling helped them focus more and the doodling group recalled more correct names than the control.

The situation of a boring or monotonous telephone message made the participants doodle, and some of these participants may be used to doodling in boring situations.

Reductionism versus holism

Reductionism

The Andrade study largely adopts a reductionist approach through its controlled lab experiment, standardized procedures, operational definitions, and quantitative analysis.

These elements allow for isolating the impact of doodling on specific variables.

Holism

The study recognizes that multiple factors interact with each othe

The study considers the interplay of various cognitive processes, such as attention, memory, and daydreaming, rather than treating them as completely separate entities.

Keep Learning

To help reinforce your understanding and prepare for potential exam questions, here are some practice questions related to this study and the Cambridge International AS & A Level Psychology 9990 syllabus:

Sampling and Methodology

- Identify **two features of the sample** used in the Andrade study.
- Identify **one strength of the sample** used in the Andrade study.
- State **how the participants were allocated to conditions** in this study.
- Describe the **materials that were used** in both the ‘doodling’ condition and the ‘control’ condition in the study by Andrade.
- Outline the **procedure used** in the Andrade study for a participant who was in the doodling condition.
- Describe the **procedure of the study by Andrade**, from the point when the tape had finished playing.
- Outline how **‘monitoring performance’ was scored** in the Andrade study.

Aims and Background

- State the **aim of the Andrade study**.
- Outline **one aim** of the Andrade study.
- Describe the **background to the Andrade study**.

Results and Conclusions

- Outline **one result** from the monitoring performance scores.
- Outline **one finding** from the Andrade study.
- Outline **one conclusion** from the Andrade study.

Applications

- Suggest **one real-world application** of the Andrade study.
- Explain **one real-world application** based on the finding from the Andrade study.
- Describe how the results of the study by Andrade (doodling) could be applied to **help workers doing repetitive jobs** who find it hard to concentrate.
- Suggest **one real-world application** based on the results of the Andrade study.

Links to Approaches and Debates

- Explain why the Andrade study is from the **cognitive approach**.
- Outline what is meant by the **cognitive approach** in psychology and include examples from the Andrade study.
- Describe the **psychology being investigated** in the Andrade study.
- Outline the **debate about individual and situational explanations** in psychology.
- Explain why the Andrade study supports either the individual or situational side of the debate.
- Explain **one reason why Xander is correct and one reason why Silvia is correct** about individual and situational explanations for the Andrade study.
- Explain how **one finding from the study by Andrade** supports **one of the assumptions of the cognitive approach**.

Evaluations

- Evaluate the study by Andrade in terms of **two strengths and two weaknesses**. At least one of your evaluation points must be about the use of quantitative data.
- Evaluate the study by Andrade in terms of **two strengths and two weaknesses**. At least one of your evaluation points must be about generalisations.
- Explain **one strength of the Andrade study**.
- Identify one **strength of this study in relation to the experimental design used**.
- Explain **one similarity and one difference** between the Andrade study and one other core study from the cognitive approach.

Other

Describe the **materials that were used** in both the ‘doodling’ condition and the ‘control’ condition in the study by Andrade.