

LEONIE BANNING

Lacking control, Pattern Perception, and Symptom Overendorsement

ORIGINAL PAPER

Whitson and Galinsky (2008) claimed to have shown that a state of chaos – i.e. uncontrollability – promotes pattern perception and spurious beliefs. In this lab report, we discuss an attempt to replicate Whitson and Galinsky's (2008) results. Furthermore, we tried to go one step further by exploring the possibility that uncontrollability and fantasy proneness promotes symptom overendorsement as an internal strategy to create order. In a within-subjects design, we asked 28 individuals to think about an uncontrollable situation or a situation in which they had been in full control. Next, participants were given a Snowy Picture Task (VPT), a Superstitious Beliefs Test (SBT), and a test tapping into symptom overendorsement (SIMS). We found that whether being in control or lacking control does not influence symptom overendorsement. Furthermore, we were not able to replicate Whitson and Galinsky's (2008) results. Limitations and implications are discussed.

Keywords: Lacking control, pattern perception, symptom overendorsement

Leonie Banning
Maastricht University, Maastricht, The Netherlands

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INTRODUCTION

According to Pittman and Heller (1987), human beings have preferred internal conditions such as consistency, perceptions of freedom, or perceptions of being in control. These preferred internal conditions can be considered as a sort of cognitive homeostasis, or as an equilibrium. If any of these conditions produces cognitive dissonance by deviating from the preferred conditions, then the individual will act upon them to restore the cognitive homeostasis (p. 467-468).

The attribution theory (Jones, 1985) focuses on why and what attributions would be made given different sets of information. Initially it was assumed that attributions would make sure that the social world is predictable and controllable, for us human beings (Pittman et al., 1987). By linking the homeostatic approach to the attribution theory, some authors formulated the hypothesis that lacking control will lead to an increase in control-directed behavior, by creating attributional explanations for events. In 1980, Pittman and Pittman conducted an experiment in which they exposed participants to varying degrees of control deprivation. Next, they measured to what extent subjects' attributions were affected by variations of how much information was available to them. The authors found that the attributions of subjects who had lacked control were significantly more affected by variations in the available stimulus information, in comparison with subjects who did not experience a lack-of-control (Pittman & Pittman, 1980). In 1983, this experiment was replicated by McCaul, who also confirmed this hypothesis.

Symptom endorsement can also be seen as a form of attribution. In line with the literature (Wood, 2004), we contend that a diagnostic label and the symptoms it implies might provide the individual with a causal attribution for the anxiety caused by chaos. In other words, after being diagnosed, some individuals feel like they are not in control over their behaviors and cognitions, resulting in attributional processes.

In 2008, Whitson and Galinsky conducted six experiments that demonstrated that lacking control motivates pattern perception. They concluded that "the need to be and feel in control is so strong that individuals will produce a pattern from noise to return the world to a predictable state" (p. 117). By perceiving illusory patterns, it feels like the world functions as an organized system. People assume that one incident influences another and that there are patterns in how things evolve. These relationships, also perceived at a perceptual level, make people believe that they can predict and affect future events (Kay, Whitson, Gaucher & Galinsky, 2009). In turn, this restores feelings of being in control. For example, in one of their experiments, Whitson and Galinsky (2008) asked their participants to think of uncontrollable events and then gave them a Superstitious Belief Task (SBT) and a Snowy Pictures Task (SPT). Scoring high on SBT and identifying images in snowy pictures is a manifestation of illusory pattern perception. The authors found that subjects in experimental uncontrollability scored higher on these tasks than controls.

In light of the previous research, we explored whether uncontrollability induces symptom overendorsement compared to situations of controllability. We also evaluated whether a trait known as fantasy proneness might play a role in the connection between uncontrollability and symptom overendorsement, the basic idea being that people high on this trait are better able to imagine a scenario in which symptom overendorsement provides an explanation for feelings of uncontrollability. Note in this context that, for example, students high in fantasy proneness more often suffer from the Medical Student Syndrome (Candel & Merckelbach, 2003). Knowledge or beliefs about illnesses that people have will influence their interpretation of bodily sensations. According to Mittenberg, Digiulio, and Perrin (1992), the interaction between selective attention and expectation can produce symptoms mimicking any disease. For example, when medical students learn about

symptoms of a disease, this will heighten their illness perceptions (i.e. making attribution errors), which in turn will lead to more self-appraisal.

To sum up, then, in this study, we tried to replicate Whitson and Galinsky's (2008) findings. Next, following their line of reasoning, we evaluated whether besides illusory pattern perception another phenomenon may occur to reduce feelings of lacking control: namely, symptom overendorsement.

METHODS

Participants

In total, 28 Psychology students (24 female) with a mean age of 22 years ($SD = 2.77$; range: 18 to 27 years) participated in the study. They were contacted by sending emails and by posting advertisements for the study on social media. The participants received a financial bonus of €15 after completing the study.

Measures

Creative Experiences Questionnaire (CEQ)

This is a 25-item self-administered questionnaire to measure fantasy proneness. Participants are presented with 25 items and answer them with yes/no. A sample item is: "Many of my fantasies have a realistic intensity". To obtain a total CEQ score, yes-answers are summed. This results in a score ranging from 0-25, with higher scores indicating higher levels of fantasy proneness. The scale takes about 5 minutes to complete. Merckelbach, Horselenberg, and Muris (2001) examined the psychometric properties of the Dutch version of the CEQ. They found a test-retest reliability of .95 (with the second measurement conducted 6 weeks after the first measurement), and sufficient internal consistency (Cronbach's $\alpha = .72$).

Structured Inventory of Malingered Symptomatology (SIMS)

This is a 75-item self-administered questionnaire to detect symptom overendorsement. Its items pertain to rare and atypical symptoms and statements. Participants indicate whether the item is true or false. The SIMS contains five subscales: low intelligence (LI), affective disorders (AF), neurological impairment (N), psychosis (P), and amnesic disorders (AM). Each subscale contains 15 items. Merckelbach and Smith (2003) examined the psychometric properties of the Dutch version of the SIMS. They found a test-retest reliability of .72, and an acceptable consistency (Cronbach's $\alpha = .72$) for the SIMS total scale. However, internal consistency for the subscales was low and varied between .24 (LI) and .59 (AF). Furthermore, they found a modest but significant correlation ($r = .33, p < .01$) between fantasy proneness, as measured by the CEQ, and the SIMS. This correlation makes sense if one assumes that fantasy proneness is accompanied by a positive response bias when answering odd items.

Superstitious Beliefs Task (SBT)

Based on the superstition task of Whitson and Galinsky (2008), we made our own version of this task, the Superstitious Beliefs Task (SBT) (see appendix A). Participants were presented with five scenarios. In each scenario an event was preceded by an action that was not necessarily objectively connected to it. For example, "Imagine you are a student and you have an important exam today. Normally, your mother lights a candle. It is her way to think of you and help you through your exam. You have a bad feeling about the exam, it did not go very well. Afterwards, when you are on the phone with your mother, it turns out that she forgot to light a candle. To what extent do you feel that not lighting the candle was of influence on your performance on the exam?" The participants were asked to read the scenarios carefully. It was stressed that there were no right or wrong answers. They were asked about the extent to which they felt one event was connected to the other, by indicating their answer on a Likert-scale. The scale ranged from 0 ("These things have nothing to do with each other.") to 10 ("These things have everything to do with each other."). The total SBT score on this test was computed by averaging all scores.

Visual Perception Task (VPT)

Based on the 'Snowy Pictures task' of Whitson and Galinsky (2008), we made our own version of this task (see appendix B). This task consisted of a series of 10 pictures of scattered dots. Eight pictures consisted of random scatters of black dots or small stripes on a white background and any identification of an object in the pictures is evidence for illusory pattern perception. To increase the credibility of the task, two pictures depicted a real image (one of a house and one of a horse), but they were degraded so that it was difficult to discern a meaningful image. These pictures were presented in the second and sixth position. When computing a total score, the score for the two pictures with real images were omitted, since their contribution does not tell us anything about the illusory perception of images.

Participants were told that it is important in daily life to see and recognize objects, even if they are not entirely visible. This can happen if objects are degraded by snow, rain, haze, darkness, or other visual obstructions. Next, they were told they would be presented with ten ambiguous images on the computer screen. Every image would be visible for 3 seconds each. Images had a size of 15 by 16 cm. The participants were asked about the extent to which they thought there was a figure, object, or pattern in the image, by indicating their answer on a Likert-scale. This scale ranged from 0 ("I do not see anything at all.") to 10 ("I clearly see a pattern."). If their answer was positive, they were also asked to write down what it was they had seen. The participants could decide for themselves how long they would take to answer this question, since they had to push a button to go to the next image. The total score on this test was computed by summing all scores (except for image 2 and 6, since these depicted real images) and then averaging them.

Procedure

Upon arrival, participants were told they were going to complete five unrelated tasks. Participants were asked to report some basis demographic details, such as

gender, age, and education level/profession. The study consisted of five tasks (the two autobiographical recall tasks were considered as one task). All participants started with a CEQ. Next, in the autobiographical recall task, half of the participants were asked to report an event in which they were completely in control, and the other half was asked to report an event in which they lacked control. The third task was the SIMS, the fourth again an autobiographical recall task. The participants who previously reported the being-in-control event now reported a lack-of-control event, and vice-versa. The two last tasks were a VPT and a SBT. Participants were randomly assigned to one of the two condition sequences (control-lacking control; lacking control-control).

The instruction for the lack-of-control event was: "You are asked to describe a recent incident that has happened to you, in which you were not in control. Think of something like: failing your driving test, or being in the chair at the dentist. Describe the situation in which you felt lack of control as specific as possible – what happened, how you felt, how it ended, and so on." The instruction for the being-in-control event was: "You are asked to describe a recent incident that has happened to you, in which you were in total control. Think of something like: playing a game and having total superiority over the opponent, or giving a speech which goes exactly as you planned it. Describe the situation in which you were in control as specific as possible – what happened, how you felt, how it ended, and so on."

Statistical analyses

Statistical analyses were performed using SPSS 21.0 software.

At group level, *t*-tests were computed to compare the control and lack-of-control conditions on SIMS, SBT, and VPT. The SIMS was further analyzed, first by only taking the first 10 responses on this test, and secondly by taking only the mood disorder subscale. These scores were also compared between control and lack-of-control condition. In addition, effect sizes (Cohens's *d*) were computed. Correlations (Pearson: product-moment) were computed both between CEQ, SIMS, SBT, and VPT, and between CEQ and the other variables (SIM, SBT, and VPT) per condition for each test. A *P*-value of $\leq .05$ was considered statistically significant. No correction for multiple comparison was performed.

One participant skipped a question on the CEQ, and two participants skipped a question on the SIMS. In both cases, these missing values were dealt with by mean substitution; taking the average response on these items from all other participants (Anderson, Basilevsky & Hum, 1983).

RESULTS

Table 1 shows mean scores and standard deviations of the two conditions on the CEQ, SIMS, VPT, and SBT. We carried out a series of *t*-tests to compare the two conditions.

Table 1. Summary of results in control and lack of control condition (N = 28)

	Condition	Mean	SD	Chronbach's alpha	t	p	Cohen's d
SIMS	Control	14.00	3.44	.66	.81	.43	.30
	Lacking control	12.86	4.04				
SBT	Control	26.60	27.56	.89	-.09	.93	.04
	Lacking control	25.83	14.06				
VPT	Control	16.19	16.60	.91	.41	.68	-.16
	Lacking control	19.08	20.25				

As can be seen in table 1, there is no significant difference between the two conditions (control vs. lack-of-control) with regard to the various tests. Thus, it is not the case that lack of control enhances superstitious beliefs (SBT), illusory pattern perception (VPT), or symptomatology (SIMS).

With regard to symptomatology, we carried out two further tests. First, effects of lack of control might be short-lived, while the SIMS is a lengthy test. Therefore, we compared control and lack-of-control group with regard to their first 10 responses. Means were 2.79 ($SD = 1.25$) and 2.78 ($SD = 1.05$), respectively, and this group difference was not significant: $t(26) = 0.02, p > .05$. Second, the SIMS contains extreme (e.g., psychotic, amnesic) and less extreme subscales (mood disorders). One might argue that the effects of lack of control are subtle and do only occur with regard to more plausible symptoms. Therefore, we compared the control and lack-of-control group with regard to their mood disorder subscale score. Means were 3.79 ($SD = 2.08$) and 3.07 ($SD = 1.21$), respectively, and this group difference also failed to reach significance: $t(26) = 1.11, p < .28$.

Table 2 shows the Pearson product-moment correlations between CEQ, SIMS, VPT, and SBT. As can be seen, the correlation between SIMS and CEQ was significant, while that between CEQ and SBT reached borderline significance ($p = .08$).

Table 2. Pearson correlations between variables.

	CEQ	SIMS	SBT	VPT
CEQ	—			
SIMS	.45*	—		
SBT	.33	0.07	—	
VPT	-.07	0.02	0.20	—

* $p < 0.05$ level

Table 3 shows the Pearson product-moment correlations between CEQ ($M = 8.96$; $\min = 2$, $\max = 18$; $SD = 3.90$) and other variables within the two conditions (control and lack-of-control). As can be seen, only the correlation between the CEQ and the lack-of-control condition of the SIMS was significant. Participants scoring high on the CEQ also scored high on the SIMS, but only when not being in control, $r = .60$, $p < .05$. The correlation between CEQ and SBT within the lacking-control condition ($r = .43$) reached borderline significance ($p = .13$)

Table 3. Pearson correlations of CEQ with other variables within conditions.

	Condition	p
SIMS	Control	.28
	Lacking control	.60*
SBT	Control	.30
	Lacking control	.43
VPT	Control	-.07
	Lacking control	-.06

* $p < 0.05$ level

DISCUSSION

The main results of the current study can be summarized as follows. First, we could not replicate Whitson and Galinsky's (2008) finding that lacking control leads to increased pattern perception and superstition. Second, we could neither confirm our own hypothesis, namely that lacking control promotes symptom overendorsement. We did find a borderline significance between the two conditions on the SIMS. However, the findings indicated that being *in* control led to a higher score on the SIMS. This is in contrast to our hypothesis, that *lack* of control would lead to higher scores on the SIMS. Finally, we found that participants scoring high on the CEQ also scored high on the SIMS within the lack-of-control condition. These findings are in line with the literature (Merckelbach et al., 2003) in that individuals high on fantasy proneness are more inclined to symptom overendorsement.

A limitation of this study is the small sample size ($N = 28$), with the majority of the subjects being female and all being in the same age range. However, Whitson and Galinsky's (2008) employed in their studies samples of 36 and 41, with the majority of the subjects also being female undergraduates. Thus, this should be no reason for the different results found. With this small sample, the authors found no significant results, but they found medium to large effect sizes ($d = .60$ and $d = .65$ for the VPT and SBT respectively). In contrast, we found only small effect sizes ($d = -.16$ and $d = .04$).

It is possible that our lack of findings is a result of our measurement instruments. Some small factors differed regarding our VPT with the Snowy Pictures Task of

Whitson and Galinsky (2008). Whereas they showed 12 pictures with and 12 pictures without an image, we only showed 2 pictures with and 8 without. In addition, they asked their subjects only to identify whether an image or not existed in the picture. To obtain more precise data, we asked the subjects to indicate the extent to which they thought there was an image in the picture. This scale difference might explain the small effect sizes found. However, if these small differences in task variables are the reason for our failure to replicate their findings, it is questionable to what extent this phenomenon can be generalized.

A more fundamental problem in our set-up is the cross-over in our manipulation. People who first were in control later were asked to think of an uncontrollable situation and vice versa. This provided us with direct controls of the subjects, thus increasing the power. However, this may have attenuated the second manipulation. That is, people who first think of a situation in which they had perfect control might be reluctant to imagine a lack of control scene.

Relatedly, we did not check whether subjects adhered to their instructions and really thought about controllable or uncontrollable situations. Follow-up research is necessary in which controllability is directly manipulated.

Another factor that might explain the obtained results is the difference between the expectations of Whitson and Galinsky (2008) and our own. As shown by Doyen, Kelin, Pichon, and Cleeremans (2012), the beliefs of the experimenter may subtly be communicated to the participants, hereby affecting the behavior of the participant. It may be the case that participants were unconsciously influenced to conform their behavior to the expectations of the experimenters, for example whilst communicating with the participants. In order to have a controlled replication, the experimenters' expectations should be manipulated.

Although we did not find any effects of lacking control on symptom overendorsement, we did find that individuals high on fantasy proneness, experience more symptom overendorsement when not being in control. This tells us that maybe controllability affects symptom overendorsement, but in a subtle way. Thus, before rejecting the idea of symptom overendorsement as a way to regain control, a stronger experiment – with more *N*, no carry-over, a direct manipulation of control, and a manipulation of the experimenter's expectations – is required.

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REFERENCES

- Anderson, A.B., Basilevsky, A. & Hum, D.P.J. (1983). Missing data: A review of the literature. In P.H. Rossi, J.D. Wright, & A. B. Anderson (Eds.), *Handbook of survey research* (415-494). San Diego: Academic Press.
- Candel, I. & Merckelbach, H. (2003). Fantasy proneness and thought suppression as predictors of the Medical Student Syndrome. *Personality and Individual Differences*, 35, 519-524.
- Doyen, S., Klein, O., Pichon, C. & Cleeremans, A. (2012). Behavioral Priming: It's all in the Mind, but Whose Mind? *PlosOne*, 7, 1-7.
- Merckelbach, H., Horselenberg, R., & Muris, P. (2001). The Creative Experiences Questionnaire (CEQ): a brief self-report measure of fantasy proneness. *Personality and Individual Differences*, 31, 987-995.
- Merckelbach, H., & Smith, G.P. (2003). Diagnostic accuracy of the Structured Inventory of Malingered Symptomatology (SIMS) in detecting instructed malingering. *Archives of Clinical Neuropsychology*, 18, 145-152.
- Mittenberg, W., Digiulio, D.V. & Perrin, S. (1992). Symptoms following mild head injury: expectations aetiology. *Journal of Neurology, Neurosurgery and Psychiatry*, 55, 200-204.
- Kay, A.C., Whitson, J.A., Gaucher, D. & Galinsky, A.D. (2009). Compensatory control: Achieving order through the mind, our institutions, and the heavens. *Current Directions in Psychological Science*, 18, 264-268.
- Pittman, T.S., & Heller, J.F. (1987). Social Motivation. *Annual Review Psychology*, 38, 461- 489.
- Pittman, T.S., & Pittman, N.L. (1980). Deprivation of control and the attribution process. *Personality and Social Psychology*, 39, 377-389.
- Whitson, J.A., & Galinsky, A.D. (2008). Lacking control increases illusory pattern perception. *Science*, 322, 115-117.
- Wood, R. (2004). Understanding the 'miserable minority': A diathesis-stress paradigm for post-concussional syndrome. *Brain Injury*, 18, 1135-1153.

APPENDIX A – SBT

You will get to read five different scenarios. After reading each scenario carefully we want you to indicate your answer by marking the line. Give the answer that best reflects your impression. Note that no answer is right or wrong.

Scenario 1.

Imagine you are working in the market department of a large company. Your marketing ideas are almost always accepted in meetings. Usually, before a meeting starts, you stomp your feet three times on the ground before entering the meeting room. Unfortunately, today you were in a hurry and you forgot to stomp your feet. In the meeting all your ideas were completely ignored. To what extent do you feel that not stamping your feet on the ground is related to the ignoring of your ideas?

Please answer by putting a mark on the following scale (0 = these events have

nothing to do with each other; 10 = these events have everything to do with each other). Select the position on the line that best reflects your impression.

0

10

These events have
nothing to do with
each other

These events have
everything to do
with each other

Scenario 2.

Imagine you are a student who lives at campus. During the weekend you would like to visit your parents. These suggest that you travel by train, however, you would like to travel using the car in order to practice your driving skills. The discussion which transportation you will take ends in an argument. Against your parent's wishes you still take the car. Along the way you get a flat tire, and you are forced to wait for help. To what extent do you feel that your rebellious behavior is related to the car troubles? Please answer by putting a mark on the following scale (0 = these events have nothing to do with each other; 10 = these events have everything to do with each other). Select the position on the line that best reflects your impression.

0

10

These events have
nothing to do with
each other

These events have
everything to do
with each other

Scenario 3.

Imagine that you play soccer at a high competition level. You and your teammates have the habit to sing a motivating song before the start of the game. The new coach thought this was nonsense and made you start the game without singing the team song. You lost 3-0. To what extent do you feel that not singing the song is related to losing the game?

Please answer by putting a mark on the following scale (0 = these events have nothing to do with each other; 10 = these events have everything to do with each other). Select the position on the line that best reflects your impression.

0

10

These events have
nothing to do with
each other

These events have
everything to do
with each other

Scenario 4.

Imagine that you have to pay the dentist a visit. Before every visit, you have the habit to knock three times on the wooden table in the waiting room. So far, you have never had any problems with your teeth. Today you had such a nice conversation with another patient, that you totally forgot to knock on the table. The dentist finds a mark in your teeth. To what extent do you feel that not knocking on the table is related to finding the mark in your teeth?

Please answer by putting a mark on the following scale (0 = these events have nothing to do with each other; 10 = these events have everything to do with each other). Select the position on the line that best reflects your impression.

0

10

These events have
nothing to do with
each other

These events have
everything to do
with each other

Scenario 5.

Imagine that you are a student. Today you have an important exam. Normally your mother always lights a candle, to think of you and to help you. You have a bad feeling about the exam. Afterwards, you speak with your mother and she tells you that she has forgotten to light the candle. To what extent do you feel that not lighting the candle is related to your exam results?

Please answer by putting a mark on the following scale (0 = these events have nothing to do with each other; 10 = these events have everything to do with each other). Select the position on the line that best reflects your impression.

0

10

These events have
nothing to do with
each other

These events have
everything to do
with each other

APPENDIX B – VPT

In daily life it is important to see and recognize objects, even if they are degraded by snow, rain, haze, darkness, or other visual obstructions. You are presented with 10 ambiguous images on the computer screen. Every image is visible for 3 seconds each. After inspection of the image, you are asked about the extent to which you have seen a figure, object or pattern in the image. Indicate your answer by marking the scale (ranging from 0 = 'I do not see anything at all' to 10 = 'I clearly see a pattern'). If you answer positively, also write down what it is that you have seen. Note that no answer is right or wrong.

Image 1

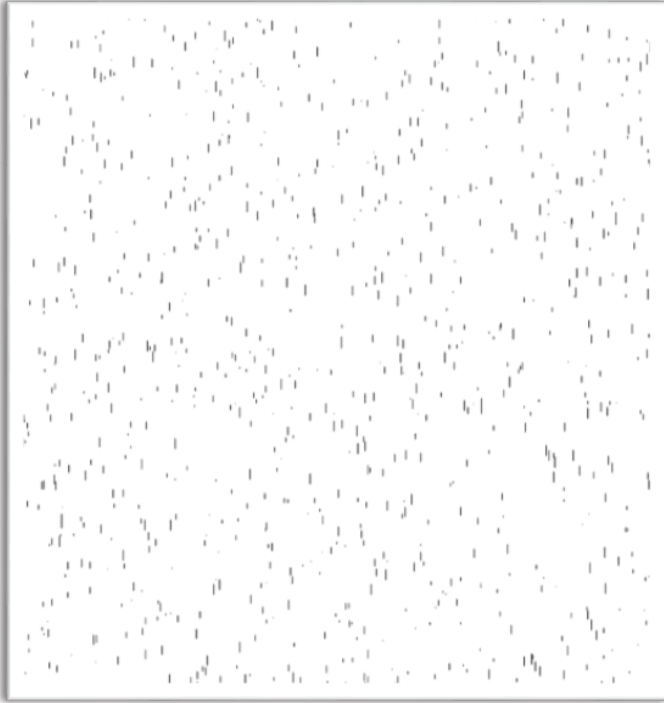


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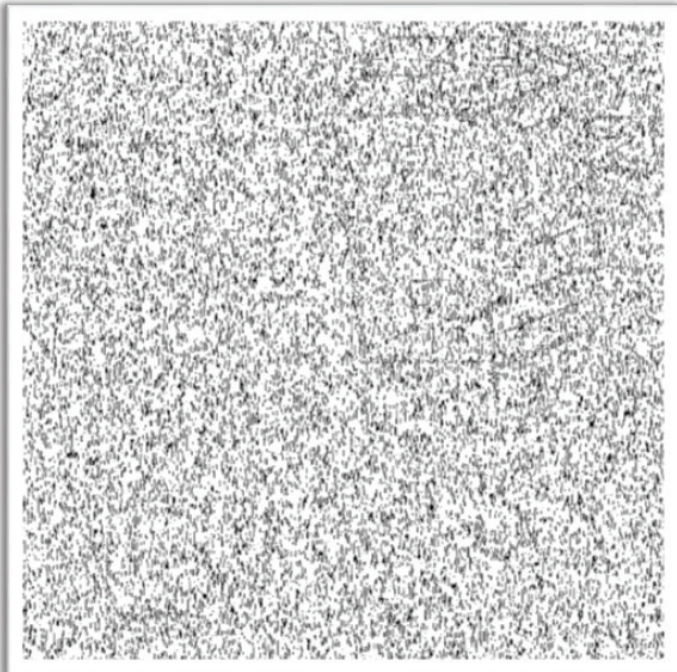


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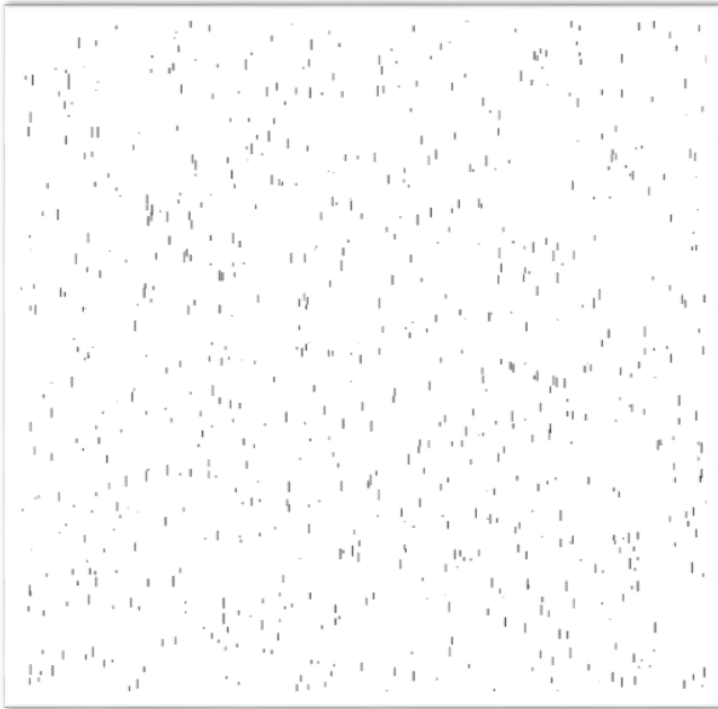
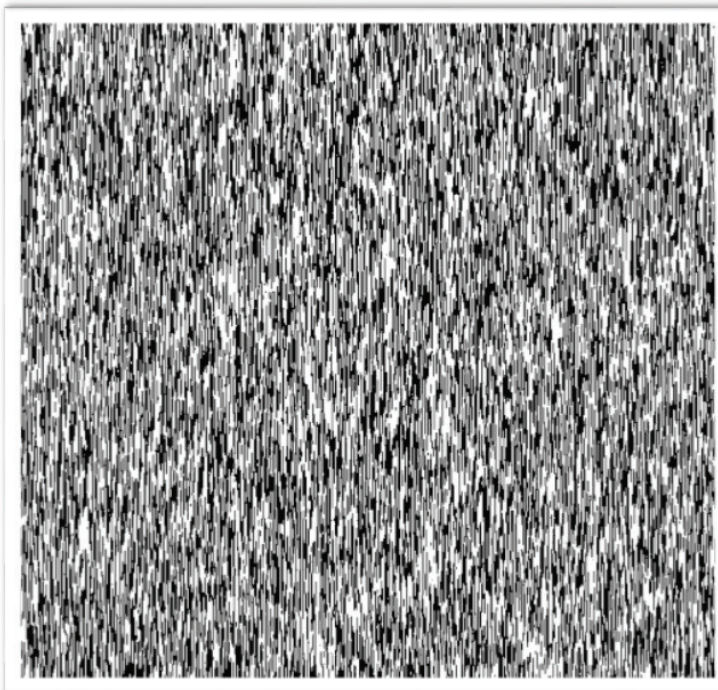


Image 3



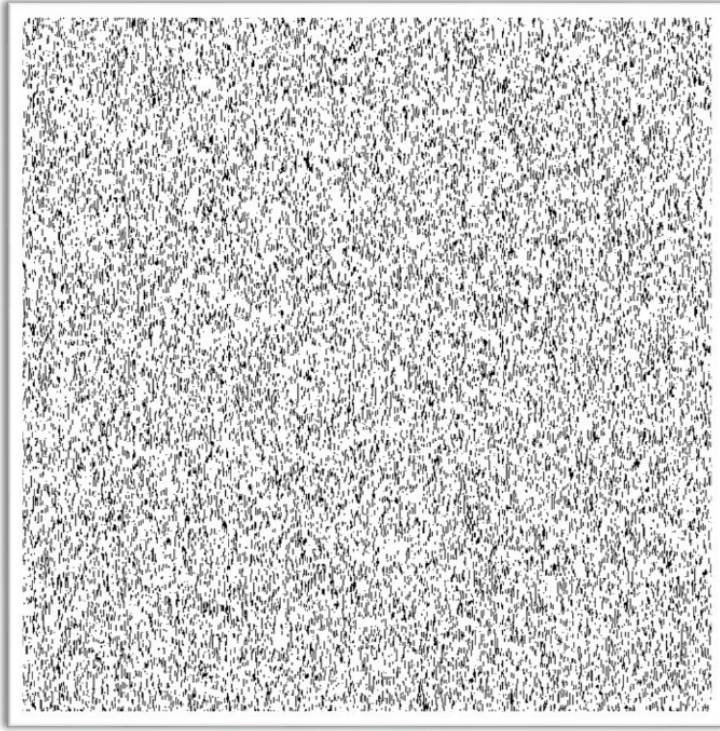


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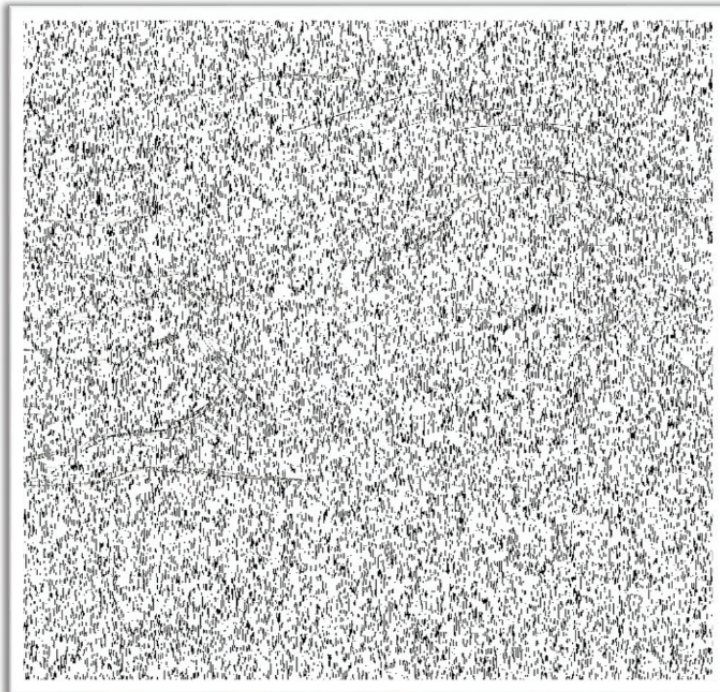


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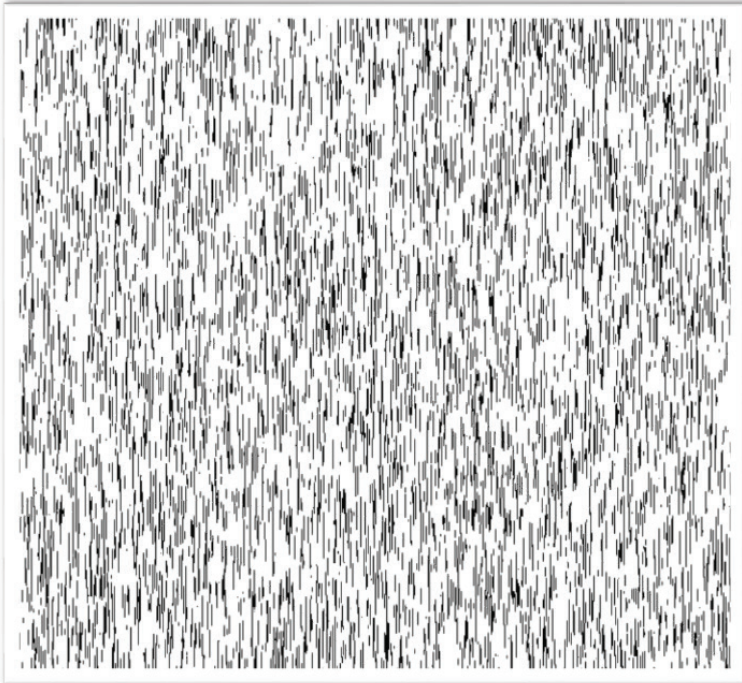


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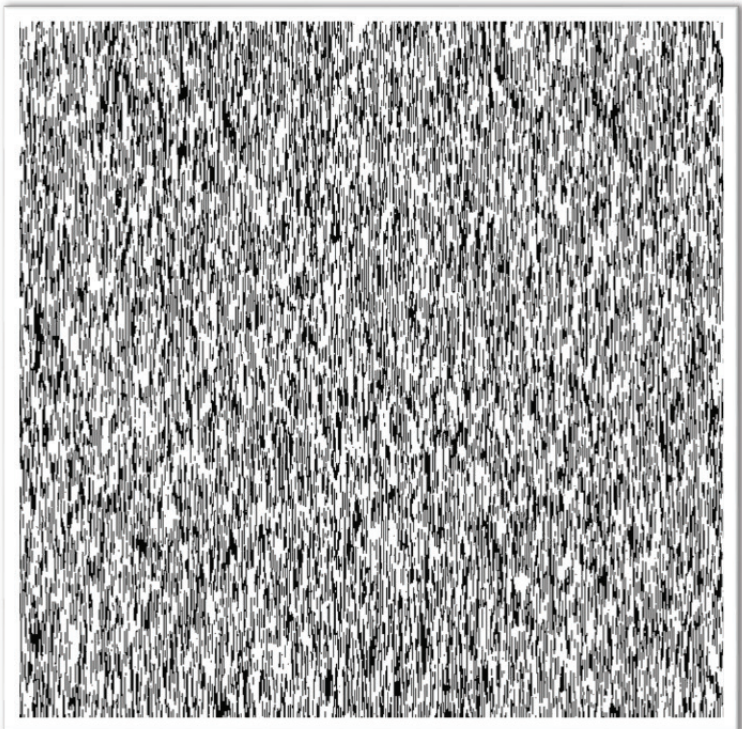


Image 7

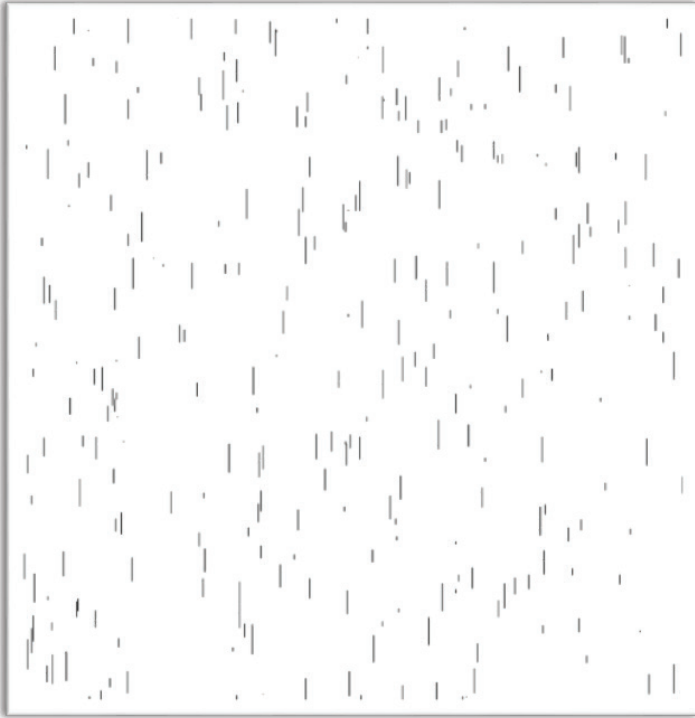


Image 9

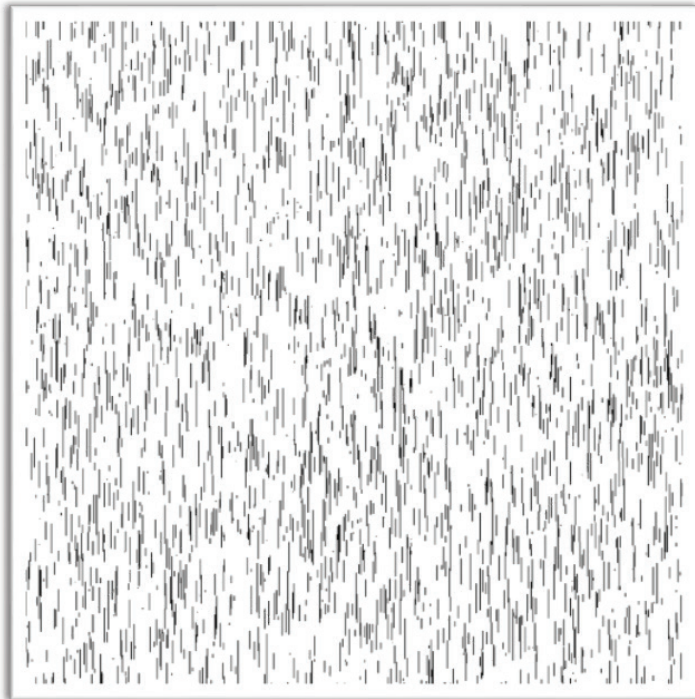


Image 10