Routines and Regret: An Examination of Behavioral Norms and Emotional Responses*

Reproduction of 'The impact of past behaviour normality on regret: replication and extension of three experiments of the exceptionality effect, Cognition and Emotion' (Lucas Kutscher & Gilad Feldman, 2019)

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In this study, we investigated the relationship between routine behaviors and feelings of regret, focusing on two thought experiments: a hitchhiking scenario and a car accident scenario. We replicated and expanded upon previous research findings. Our results indicate that individuals tend to experience higher levels of regret in situations that deviate from their routine or normal behavior. This pattern was evident in both scenarios, where participants expressed more regret and perceived misfortune when actions led to negative outcomes in less common, exceptional circumstances. Such findings highlight the significance of routine in our decision-making processes and the emotional consequences of deviating from it. This research not only replicates previous studies but also extends our comprehension of how societal norms and personal routines influence our feelings of regret, providing valuable perspectives for both psychological theory and practical applications in managing emotional well-being.

Table of contents

*Code and data are available at: https://github.com/yunzhaol/Impact_regret.git. A replication of various aspects in this paper are available at: https://doi.org/10.1080/02699931.2018.1504747

1 Introduction

Regret is a cognitive and emotional experience in which an individual experiences sadness with a painfully cognitive and emotional state. Regret is experienced when realizing that a different decision or circumstance could have resulted in a more positive or desirable outcome (Kahneman & Tversky, 1982). Regret may also be a mechanism for human self-control. Inman (2007) pertinently assessed what regret means to people: it can have either an adaptive function, allowing people to learn from failures and improve future decisions, or a non-adaptive function, causing people to focus on the past. Regret is closely related to our daily decisions, cognitive styles, and emotional experiences, so the study of regret is important.

Kahneman and Miller (1986) emphasized normality as a central determinant of regret and counterfactual thinking-imagining alternative versions of the past about what might have happened differently (Byrne, 2016; Miller, Turnbull, & McFarland, 1990; Roese, 1997). They summarize evidence that anomalous behavior tends to trigger more counterfactual thinking and stronger feelings of regret. They discussed the concept of normality extensively, covering experimental studies involving the odds of influencing the perception and/or interpretation of what is normal as a reference point for comparing behaviors to assess whether a person's behavior is normal or exceptional for that person.Lucas Kutschera and Gilad Feldman simulated abnormal behavior and regret through three scenarios and found the correlation between routines and regret. We replicated their paper with expanded applications and practical implications of the research.

We replicate the paper by Adrien Fillon, Lucas Kutscher and Gilad Feldman (2021) and focus on the following research question: 1.What is the relationship between routine and regret under the hitchhiking scenario thought experiment? 2.What is the relationship between routine and regret under the car accident scenario thought experiment?

For all data wrangling and analysis, we utilize R (R Core Team 2023), complemented by a suite of R packages: ggplot2 (Wickham 2016) for visualization, dplyr (Wickham et al. 2021) for data manipulation, along with others such as scales (Wickham and Seidel 2020), knitr (Xie 2021), kableExtra (Zhu et al. 2024) and tidyverse (Wickham et al. 2019) for tasks including data cleaning and modification. Additionally, packages like MBESS (Kelley 2020), psych (Revelle 2021), Hmisc (Jr, Charles Dupont, and others 2021), effsize (Torchiano 2020), jmv (Love 2021), Rcpp (Eddelbuettel and Balamuta 2021), reshape2 (Wickham 2017), readr (Wickham and Hester 2021), and janitor (Firke 2023) assist in processing data and viewing statistical information. Importantly, the creation of tables and figures is directly based on the statistical data obtained, ensuring our results are accurately represented and effectively communicated.

The remainder of this paper is structured as follows. Section 2 In the Data part, we detail the methodology behind our data collection and analysis, and describe the survey data used. Section 3 In the Result part, We employ plots and textual analysis to present our findings in two scenario, illustrating the relationship between routine, regret, social norms, and negative

affect across different contexts. Section 4 Moving beyond the raw data, the Discussion part interprets our findings within a broader psychological and societal framework. Section 5 In the conclusion part, we summarize our key discoveries, how our results contribute to the existing body of knowledge on regret and routine behaviors. Section A In the appendix, the processes of simulating, reading, cleaning, gathering statistical insights, and testing the data are comprehensively outlined.The figures and tables are based on the data collected and detailed in the appendix section that aggregates statistical information.

2 Data

2.1 Source

This paper will replicate the survey data originally collected for the (2021) paper by Adrien Fillon, Lucas Kutscher and Gilad Feldman. For part1, we used the survey to collect responses from participants in the following contexts to four questions, which were designed according to the dimensions of regret, social norms (injunctive norms and descriptive norms), and negative impacts. For part2, the survey was used to collect participants' ratings of regret in different scenarios, as well as their perceptions of randomness and luck factors.

There were 342 participants in the replication experiment (127 males, 215 females, Mage = 39.93, SDage = 12.88). , which are listed below. Given scenario: Mr. Jones almost never takes hitch-hikers in his car. Yesterday he gave a man a ride and was robbed. Mr. Smith frequently takes hitch-hikers in his car. Yesterday he gave a man a ride and was robbed (Kutscher and Feldman 2019).

2.2 Measure

The experimental design consisted of two parts, both replications of the scenarios and data presented in the Kahneman and Miller (1986) paper - the hitchhiking scenario and the car accident scenario.

In the Part1, Participants answered two questions regarding perceived social norms, measuring descriptive norms –"whose behaviour do you think is more common in society? (Mr. Jones / Mr. Smith)" and injunctive norms – "whose behaviour do you think will be more criticised by others in society? (Mr. Jones / Mr. Smith)"(Lucas Kutscher & Gilad Feldman (2019)) And for Negative affect, the measure was implemented as an explanatory variable with no specific hypothesis – "contemplating your previous answers about this scenario and factoring in both Mr. Jones and Mr. Smith personal routines and your perceptions of social norms and possible social criticism, who do you think overall experienced more negative feelings about the decision to take a hitch-hiker that day?" (Mr. Jones / Mr. Smith)(Lucas Kutscher & Gilad Feldman (2019))

In the Part2, the survey used the car accident scenario presented in Kahneman and Miller (1986, p. 145), presenting the routine verses exception in two scenarios, Mr. Adams, and Mr. White. Participants rated the two scenarios on the dimensions of regret, luck, and randomness. Regret was measured using the following question adapted from the original study – "who is more upset over the accident?" (Mr. Adams / Mr. White). Luck was measured using the following question adapted from the original study – "which of the two do you think is less lucky?" (Mr. Adams / Mr. White). Randomness was measured using the following question adapted from the original study – "Mr. Adams' accident is just a random coincidence" and "Mr. White's accident is just a random coincidence" (1 – Strongly disagree; 7 – Strongly agree).

2.3 Estimand

At the beginning of this paper, we discuss the three social experiments simulated in the original paper and the correlation found between normative behavior and regret. We then replicate and conduct a case study of some of the results from Experiments 1 and 2 to validate their findings and improve their accessibility. We first tallied the data obtained from Experiments 1 and 2. Then we plotted tables showing the most important variables. We then plotted histograms to show our target population's perceptions of the regrettable effects of past normative behaviors in two different experiments.

For part2, a measure of difference in regret that compares the difference in participant-reported regret in the event of an accident on a conventional route (Mr. Adams' scenario) and an unconventional route (Mr. White's scenario).

3 Results

3.1 Part 1: hitchhiker - scenario

Table 1 is a replication of table 1 in the original paper, and it shows a total of 342 counts and proportions for perceived regret, social norms, and negative affect in the hitch-hiking Experiment 1.

From Table 1, 315 participants with 92.1% associated higher regret with Mr. Jones rather than Mr. Smith, since Mr. Jones hardly ever takes hitch-hikers in his car. In terms of injunctive social norms, the majority of participants with 95.3% felt that Mr. Jones' behavior was more common in the society. In terms of descriptive social norms, most of the participants with 90.6% considered that Smith's behavior was more likely to be criticized by others. In terms of negative affect, most participants with 92.7% considered Mr. Jones as feeling more negative about the decision to hitchhike that day with respect to their daily routines.

Figure 1 is a replication of figure 1 in the original paper, It presents the proportion of participants' results clearly with respect to regret, social descriptive norms, social injunctive norms

Table 1: Frequency and proportion of regret, social norms, and negative affect for exp1.

	Regret	%	Soc_norm1	%	Soc_norm2	%	Negetive affect	%
Routine Smith	27	7.9	16	4.7	310	90.6	25	7.3
Exception Jones	315	92.1	326	95.3	32	9.4	317	92.7

and negative affect. According to the bar plot, there exists a high degree of consistency in participants' responses across four different aspects, with more than 90% of participants agreeing on the same point of view.

This normality of Smith's behavior, although there is no evidence to support that it would increase the probability of being robbed, participants would subjectively perceive bad past behaviour normality as leading to bad outcomes. While there is no evidence that this behavioral norm of Smith increases the probability of being robbed, participants subjectively believe that past bad behavioral norms lead to bad outcomes.

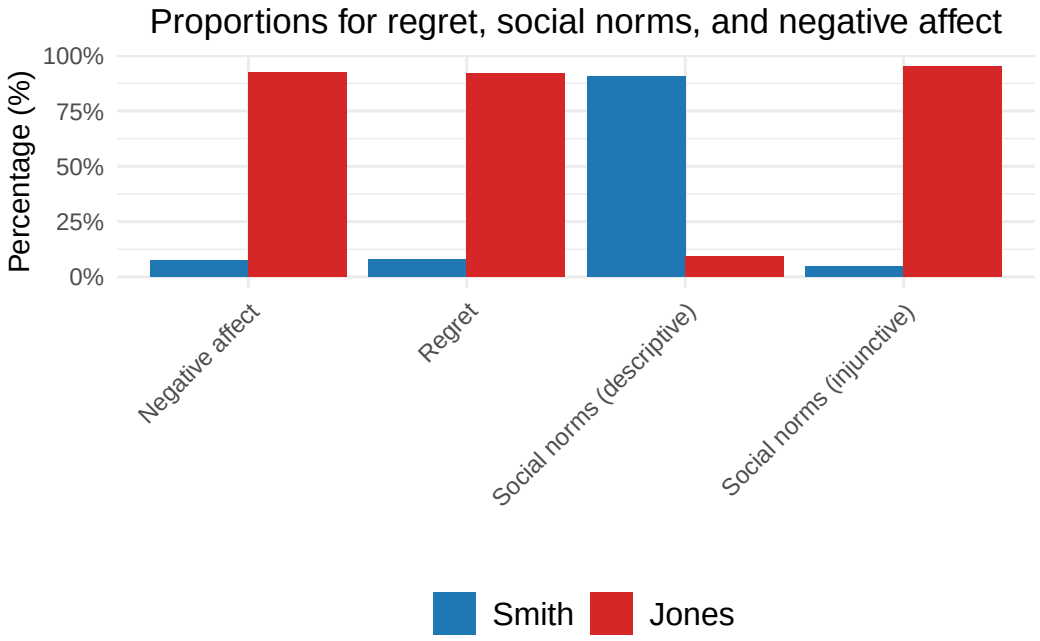

Figure 1: Proportion of regret, social norms, and negative affect for exp1.

3.2 Part 2: Car accident scenario

Table 2 shows that most participants regretted the exception (277, 81%) more strongly than the rule (65,19%; $p < .001$, $d = 1.58$). The same result can be seen more intuitively in figure2. the result for the exception event represented by Mr. White is much higher for both Regret and Luck than for the Routine event represented by Mr. Adams.

Table 2: Frequency and proportion of regret and luck for exp1.

	Choice	Count	%
Regret	Routine Adams	65	19.0
	Exception White	277	81.0
Luck	Routine Adams	114	33.3
	Exception White	228	66.7

Figure 2 is a replication of figure2 in the original paper, showing the counts and proportions of perceived regret and luck for car accident events.

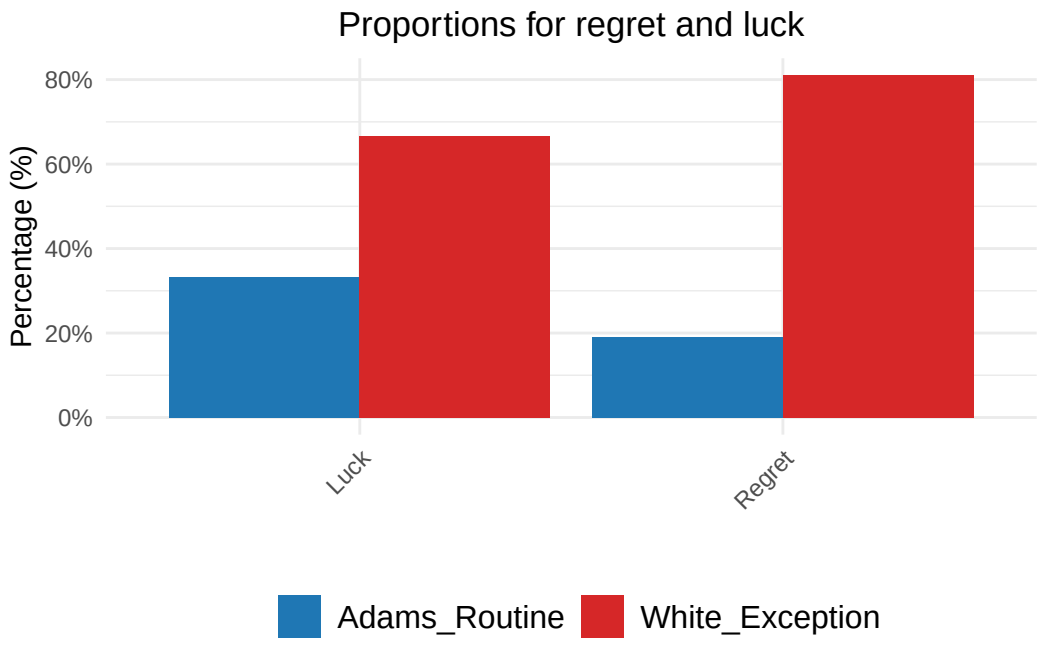

Figure 2: Proportion of regret and luck for exp2.

As one would expect, participants expressed more regret for Mr. WHITE, believing that Mr. Adams encountered a random event. One could more readily visualize an incident occurring on the usual route than on the unusual route because more paths of action could have led to the event. As a result, fewer participants (114, 33%) perceived Mr. Adams to be less lucky, while more participants (228, 66%) perceived Mr. White to be less lucky, $p < .001$, $d = 0.71$).

4 Discussion

4.1 Regret in Unconventional Choices

For part1, we reproduce and extend a classic experiment on the hitchhiking situation to prove stronger regret for exception than for routines. (reference)We used a survey to collect the participants' answers to different dimensions in this situation, according to regret, norm, and negative impact, and compared the number of answers, and made a table and a bar chart to reflect the proportion of participants' different views. We found that in questions 1, 2, and 4, more than 90% of participants who chose to represent an unconventional situation experienced a higher sense of regret, and in question 3, more than 90% of participants felt that Smith, who represented a regular situation, was more socially normative. The results of questions 2 and 3 support our hypothesis that frequent free-riding behavior is perceived by the general public as less common and is vulnerable to criticism if it conflicts with society's prohibitive norms, while the results of questions 1 and 4 are consistent with our expectation that most participants will have a stronger sense of regret for Jones and more negative feelings and effects later on. This proves the conclusion that regret for exceptional cases will be stronger than regret for normal cases, and the data supports anomalous effects.

4.2 Route Choice and Regret

As can be seen from Figure2, people felt significantly more regret about the accidents participants had in the unconventional route (Mr. White's scenario) than in the conventional route (Mr. Adams' scenario). This finding is consistent with the research of Prof. Gilad Feldman. Participants were more likely to attribute personal choices, and thus felt greater regret, when accidents occurred on less frequently used routes. This result supports our hypothesis about the relationship between road choice and feelings of regret. This is consistent with a study by Miller et al. (1989). They found that the more normal people perceived an event to be, the more similar scenarios they could imagine.

4.3 Perception of Misfortune vs. Randomness

Most participants attributed the accident Mr. White suffered more to misfortune than to randomness, possibly because the choice of an unconventional route was perceived as a more proactive decision, thus triggering stronger feelings of regret when the accident occurred. In contrast, Mr. Adams' accident was viewed more as a random event, reflecting the fact that misfortunes on routine routes are perceived to be the result of uncontrollable factors rather than a direct consequence of individual decision-making.

4.4 Implications of Regret Research

Research on regret is important because regret is prevalent in life. First, understanding how regret works can help in designing therapeutic interventions that more effectively manage regret, depression, and anxiety. For example, in the car accident incident in part2, Mr. Adams in the exception scenario would have developed greater regret and had a greater likelihood of developing psychological problems than Mr. White. One can intervene and treat Mr. Adams more proactively by gaining insight into regret. Second, insights into regret can provide strategies for improving decision-making processes in personal, professional, and political contexts, emphasizing the importance of normative behaviors and their impact on outcomes.

4.5 Bias and ethics

The difference in the participants of the survey will be the main bias, the first experiment is that we recruited 342 participants online from TurkPrime.com, and it is impossible to determine whether the sample is universal and random, and the sample size is not large enough, there are more males, all Turkish. The country's unique culture may have an impact on the data collected, such as the perception of free-riding in Turkey in general.

The experiment involves asking participants to imagine being robbed and in a car accident, which can trigger discomfort or emotional distress, especially for those who have experienced a similar event before. Research should assess this risk beforehand and provide support and interventions accordingly. The second part of the experiment involves asking participants to imagine being in a car accident, which may trigger discomfort or emotional distress, especially for those who have experienced a similar event before. Research should assess this risk beforehand and provide support and interventions accordingly.

4.6 Weaknesses and future directions

The main shortcomings of the study are that it does not analyze the impact of cultural differences on the perception of regret and decision-making, and the sample selected is not representative enough as it is Turkish, so the sample should be enlarged and screened to ensure that the data are of high quality.

Future research could explore how individual differences, such as personality traits, affect the experience of regret, or expand the current research methodology to comprehensively analyze the emotional responses related to regret and try to discover connections and patterns to gain a deeper understanding of this theory.

Weaknesses and next steps should also be included.

5 Conclusion

We replicated two parts of the (2021) paper-the hitchhiking scenario and the car accident scenario. Overall, through participant data analyses of regret, luck, social norms, and negative affect in different scenarios, we all gained support for estimand: people feel more regret when the event occurs in exception scenarios than when they are harmed in routine events.

Appendix

A Additional data details

A.1 Simulation

We simulated the dataset using the tipple function and determined the feasibility of the plan.

Table 3 and Table 4 display the top six rows of data for Experiment 1 and Experiment 2 respectively.

Table 3: Dataset Simulation for exp1

id	regret	social_norm_injunctive	social_norm_descriptive	negative_effect
1	J	J	J	S
2	S	S	J	J
3	S	S	S	J
4	J	J	S	J
5	S	J	J	S
6	J	S	S	J

Table 4: Dataset Simulation for exp2

id	regret	luck
1	A	A
2	W	W
3	W	W
4	A	A
5	W	A
6	A	W

A.2 Read raw data and evaluated demographic information

We acquired a CSV file containing raw data relevant to 'Routines and Regret: An Examination of Behavioral Norms and Emotional Responses.' Subsequently, we inspected the first six rows displayed by Table 5 and assessed the demographic details.

Table 5: First six rows of data of interest

Sc1_regret	sc1_socnorms1	sc1_socnorms2	sc1_combinednorms	Sc2_regret	Sc2_lucky
1	1	2	1	1	2
1	1	2	1	2	1
1	1	2	1	2	2
1	1	2	1	1	1
1	1	2	1	2	1
1	1	2	1	2	2

A.3 Label and test the data for statistical information

A.3.1 Label the data for exp1

We label the data in the questionnaire with values of 1 and 2 as "Routine Smith", "Exception Jones" or "Routine Adams", "Exception White". The top 6 rows of interest are shown by Table 6 and Table 7.

Table 6: First six rows of the labeled data of interest in exp1

Sc1_regret	sc1_socnorms1	sc1_socnorms2	sc1_combinednorms
Exception Jones	Exception Jones	Routine Smith	Exception Jones
Exception Jones	Exception Jones	Routine Smith	Exception Jones
Exception Jones	Exception Jones	Routine Smith	Exception Jones
Exception Jones	Exception Jones	Routine Smith	Exception Jones
Exception Jones	Exception Jones	Routine Smith	Exception Jones
Exception Jones	Exception Jones	Routine Smith	Exception Jones

A.3.2 Obtain statistical information for exp1

Statistics about the data we are interested in, such as frequencies and percentages, are generated below by the descriptives and propTest2 functions, and these statistics underpin the plotting of Table 1 and Figure 1 for experiment 1 in Results.

```
DESCRIPTIVES

Descriptives

                          Sc1_regret    sc1_socnorms1    sc1_socnorms2    sc1_combinednorms
```

N	342	342	342	342
Missing	5	5	5	5
Mean				
Median				
Standard deviation				
Minimum				
Maximum				

FREQUENCIES

Frequencies of Sc1_regret

Sc1_regret	Counts	% of Total	Cumulative %
Exception Jones	315	92.10526	92.10526
Routine Smith	27	7.89474	100.00000

Frequencies of sc1_socnorms1

sc1_socnorms1	Counts	% of Total	Cumulative %
Exception Jones	326	95.32164	95.32164
Routine Smith	16	4.67836	100.00000

Frequencies of sc1_socnorms2

sc1_socnorms2	Counts	% of Total	Cumulative %
Exception Jones	32	9.35673	9.35673
Routine Smith	310	90.64327	100.00000

Frequencies of sc1_combinednorms

sc1_combinednorms	Counts	% of Total	Cumulative %

Exception Jones	317	92.69006	92.69006
Routine Smith	25	7.30994	100.00000

A.3.3 Label the data for exp2

Table 7: First six rows of the labeled data of interest in exp2

Sc2_regret	Sc2_lucky
Routine Adams	White less lucky
Exception White	Adams less lucky
Exception White	White less lucky
Routine Adams	Adams less lucky
Exception White	Adams less lucky
Exception White	White less lucky

A.3.4 Obtain statistical information for exp2

Statistics about the data we are interested in, such as frequencies and percentages, are generated below by the descriptives and propTest2 functions, and these statistics underpin the plotting of Table 2 and Figure 2 for experiment 2 in Results.

DESCRIPTIVES

Descriptives

	Sc2_regret	Sc2_random_1	Sc2_random_2	Sc2_lucky
N	342	341	341	342
Missing	5	6	6	5
Mean		5.741935	5.668622	
Median		6.000000	6.000000	
Standard deviation		1.228689	1.231396	
Minimum		1.000000	1.000000	
Maximum		7.000000	7.000000	

FREQUENCIES

Frequencies of Sc2_regret

Sc2_regret	Counts	% of Total	Cumulative %
Routine Adams	65	19.00585	19.00585
Exception White	277	80.99415	100.00000

Frequencies of Sc2_lucky

Sc2_lucky	Counts	% of Total	Cumulative %
Adams less lucky	114	33.33333	33.33333
White less lucky	228	66.66667	100.00000

A.4 Tests

We conducted various tests to verify if the imported data aligns with our expectations for Experiment 1 and Experiment 2.

B Questionnaire details

B.1 Scenario #1

Mr. Jones almost never takes hitch-hikers in his car. Yesterday he gave a man a ride and was robbed. **Mr. Smith** frequently takes hitch-hikers in his car. Yesterday he gave a man a ride and was robbed.

B.1.1 Comprehension Questions

1. Who almost never takes hitch-hikers in his car?
    - Mr. Jones (1)
    - Mr. Smith (2)
2. Who frequently takes hitch-hikers in his car?
    - Mr. Jones (1)
    - Mr. Smith (2)

3. Who got robbed?

    - Mr. Smith (1)
    - Mr. Jones (2)
    - Both Mr. Smith and Mr. Jones (4)

B.1.2 Regret

- Who do you expect will experience greater regret over the episode?
    - Mr. Jones (1)
    - Mr. Smith (2)

B.1.3 Social Norms 1

- Whose behavior do you think is more common in society?
    - Mr. Jones (1)
    - Mr. Smith (2)

B.1.4 Social Norms 2

- Whose behavior do you think will be more criticized by others in society?
    - Mr. Jones (1)
    - Mr. Smith (2)

B.1.5 Negative Affect

- Contemplating your previous answers about this scenario and factoring in both Mr. Jones and Mr. Smith's personal routines and your perceptions of social norms and possible social criticism, who do you think overall experienced more negative feelings about the decision to take a hitch-hiker that day?
    - Mr. Jones (1)
    - Mr. Smith (2)

B.2 Scenario #2

Mr. Adams was involved in an accident when driving home after work on his regular route. **Mr. White** was involved in a similar accident when driving on a route that he only takes when he wants a change of scenery.

B.2.1 Comprehension Questions:

1. Who was driving home after work on his regular route?
    - Mr. Adams (1)
    - Mr. White (2)
2. Who was driving on a route that he only takes when he wants a change of scenery?
    - Mr. Adams (1)
    - Mr. White (2)
3. Who was involved in an accident?
    - Mr. Adams (1)
    - Mr. White (2)
    - Both Mr. Adams and Mr. White (4)

B.2.2 Regret:

- Who is more upset over the accident?
    - Mr. Adams (1)
    - Mr. White (2)

B.2.3 Random Chance:

- Please rate your agreement with the following statements:
    - Mr. Adam's accident is just a random coincidence (1 – strongly disagree to 7 – strongly agree)
    - Mr. White's accident is just a random coincidence (1 – strongly disagree to 7 – strongly agree)

B.2.4 Luck:

- Which of the two do you think is less lucky?
    - Mr. Adams (1)
    - Mr. White (2)

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