

11 December 2024

M.R.M

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Tēnā koe M.R.M

Official Information Act Request

Thank you for your request of 20 November 2024, under the Official Information Act 1982, for the following information:

Please provide me with a copy of the Level 3 NCEA Maths/Statistics paper discussed in the link provided below:

<https://scanmail.trustwave.com/?>

[c=5051&d=IYu75zboGgpqXdJzeykekXp0HLoWIO6WDhcilfR59Q&u=https%3a%2f%2fwww%2enzherald%2eco%2enz%2fnz%2frectums-and-private-parts-level-3-ncea-statistics-paper-hits-a-bumnote-with-some%2f25UAHDK72NHNXB5QGZ6QL5OELU%2f](https://scanmail.trustwave.com/?c=5051&d=IYu75zboGgpqXdJzeykekXp0HLoWIO6WDhcilfR59Q&u=https%3a%2f%2fwww%2enzherald%2eco%2enz%2fnz%2frectums-and-private-parts-level-3-ncea-statistics-paper-hits-a-bumnote-with-some%2f25UAHDK72NHNXB5QGZ6QL5OELU%2f)

Please find attached a copy of the requested examination paper and resource booklet for Level 3 Mathematics and Statistics (Statistics) 2024 91584 *Evaluate statistically based reports*.

Please note that some of the content in this response contains third-party copyrighted material. While this material is being provided to you under the OIA, this does not give you permission to use any of this material in a way that infringes on that copyright.

Our response to your request may be published on our website after five working days. Your name and contact details will be removed before publication.

If you require further assistance or believe we have misinterpreted your request, please contact ministerials@nzqa.govt.nz.

You have the right to seek an investigation or review by the Ombudsman of this decision under section 28(3) of the Official Information Act 1982. Details of how to make a complaint can be found at www.ombudsman.parliament.nz. You can also telephone 0800 802 502 or write to the Ombudsman at PO Box 10152, Wellington, 6143.

Nāku nā



Dr Grant Klinkum
Pouwhakahaere/Chief Executive

91584R



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 3 Mathematics and Statistics (Statistics) 2024

91584 Evaluate statistically based reports

Credits: Four

RESOURCE BOOKLET

Refer to this booklet to answer the questions for Mathematics and Statistics (Statistics) 91584.

Check that this booklet has pages 2–7 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.

RESOURCE ONE: UK ADULTS DON'T KNOW THE LOCATION OF THEIR BODY PARTS, NEW RESEARCH SHOWS

Only 55 per cent of men and women claim they could confidently state where the rectum is located. The startling statistic is revealed in a new poll that also found almost half of United Kingdom (UK) adults weren't clear where their reproductive organs were.

A survey commissioned by leading private healthcare clinic Pall Mall Medical showed how confused UK adults become when finding certain body parts.



Table 1: Survey results showing the percentage of respondents who could successfully find the named body part

Heart	63%
Brain	63%
Lungs	60%
Stomach	59%
Rectum	55%
Reproductive organs	52%
Kidneys	50%
Bladder	48%
Liver	43%
Appendix	38%

Dr Chun Tang, Medical Director of Pall Mall, said the findings highlighted the UK's laid-back attitude to their anatomy. "While these findings light-heartedly point out the bewilderment many UK adults face when it comes to their bodies, hopefully it carries a serious message too about the importance of knowing our bodies. Having good knowledge of our body parts and their functions is important; it enables us to be more in control of our health and understand when things might not be functioning properly," he added.

The Pall Mall survey was carried out by OnePoll on 2 000 UK adults.

Pall Mall Medical is one of the leading private healthcare and cosmetic surgery providers in the UK, offering outstanding services to self-paying patients and patients with private healthcare insurance.

Source: <https://www.pallmallmedical.co.uk/about-us/in-the-press/clueless-brits-don-t-know-their-a-from-their-elbow-new-research-shows/>

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The resources continue on the following page.**

RESOURCE TWO: SOCKS-OVER-SHOES PROVEN AS MEANS OF REDUCING WINTER FALLS

The long-standing practice of wearing socks over shoes to prevent falls on icy slopes has been supported by an innovative study from the University of Otago. The research confirms that the technique does reduce slips.

“Wearing socks over normal footwear was associated with a statistically significant improvement in traction (grip),” the researchers say in the *New Zealand Medical Journal* article which details their findings, published today.

Methods

Participants and setting: The study site was a busy, steep suburban street in Dunedin which was known to be slippery in icy conditions. Pedestrians were intercepted and asked to participate in the study. To be eligible for inclusion in the study, participants needed to be travelling in a downhill direction, and not already wearing socks over their shoes.

Members of the study team called ‘outcome assessors’ watched each participant complete the walk downhill and recorded the required data.

Participants gave their verbal consent before walking downhill.

Intervention (treatment group): Participants were randomly allocated to the intervention (socks) and control (no socks) groups. Participants in the intervention group were provided with a pair of socks to put on over their footwear (photo above). Each participant wore identical acrylic-blend work socks (size 11–14).

All participants were directed to walk downhill as normally as possible (given the conditions).

Outcomes: When the participant reached the bottom of the hill, they were asked to complete an assessment form. Self-rated slipperiness (the primary outcome) was measured using a validated slipperiness scale. Participants were asked to indicate on the five-point scale how slippery they found their descent: 1 = “not slippery”, 2 = “somewhat slippery”, 3 = “slippery”, 4 = “very slippery”, or 5 = “extremely slippery”.

To validate self-reported slipperiness, outcome assessors independently recorded (using the 5-point scale) how slippery participants appeared to have found the footpath. To detect any risk compensation in the intervention group, the assessors used stopwatches to time the descent of each participant.

Blinding: It was not possible to blind the participants and outcome assessors to treatment allocation. However, certain measures were employed to conceal the exact nature of the study hypothesis, and hence minimise biased assessment of outcome.

First, to avoid any implication that socks were superior, all recruiters and outcome assessors were instructed to wear unmodified footwear (no socks).

Second, participants and assessors were simply told that researchers were interested in assessing the performance of different types of footwear and different types of socks worn over the top.

Third, participants’ footwear was photographed for later reference, and this might have encouraged participants and assessors to think that the characteristics of footwear were important.



Results

The trial was conducted on 15 August 2008. The baseline characteristics of the participants are shown in Table 2(a).

Table 2(a): Baseline characteristics of study participants

Variables	Intervention group (<i>n</i> = 14)	Control group (<i>n</i> = 15)
Women (number (%))	7 (50)	5 (33)
Median age (range)	22.0 (19–58)	21.0 (18–70)
First winter in icy conditions (number (%))	–	1 (7)
Previous falls on ice (number (%))	8 (57)	11 (73)
≥ 1 fall this winter (number (%))	4 (29)	7 (47)
Injury from fall this winter (number (%))	1 (7)	–
Time been walking this route (number (%)):		
< 6 months	3 (21)	2 (13)
6–12 months	9 (64)	9 (60)
> 12 months	2 (14)	4 (27)

Outcomes: Wearing socks over footwear significantly improved traction (difference in mean self-reported slipperiness score of 1.3) (Table 2(b)). There was no evidence of quicker descent for the intervention group (difference in mean descent times 1.9 seconds).

Table 2(b): Primary and secondary outcomes

Outcome	Intervention group (<i>n</i> = 14)	Control group (<i>n</i> = 15)
Primary outcome (mean (SD)) Self-rated slipperiness	1.6 (1.14)	2.9 (1.32)
Secondary outcomes (mean (SD))		
Observer-rated slipperiness	1.6 (0.66)	2.3 (1.07)
Seconds to descend slope	37.7 (9.36)	39.6 (11.57)

Adverse events: The only adverse events were short periods of embarrassment for the image-conscious in the intervention group.

Sources: <https://www.otago.ac.nz/news/news/otago005086.html>

https://www.researchgate.net/publication/26741582_Preventing_winter_falls_A_randomised_controlled_trial_of_a_novel_intervention

RESOURCE THREE (a): 50% OF MEN SURVEYED THINK THEY COULD LAND A PASSENGER PLANE – EXPERTS DISAGREE

Picture this: You're nestled comfortably in your seat, cruising towards your holiday destination, when a flight attendant's voice breaks through the silence: "Ladies and gentlemen, both pilots are incapacitated. Are there any passengers who could land this plane with assistance from air traffic control?"


If you think you could manage it, you're not alone. Survey results published in January indicate about one-third of adult Americans think they could safely land a passenger aircraft with air traffic control's guidance. Among male respondents, the confidence level rose to nearly 50 per cent.


"There is a zero per cent chance of someone pulling that off," said Patrick Smith, a commercial airline pilot and founder of the *Ask the Pilot* blog. "Do people think they can perform transplant surgery? No. Then why do they think they can land a plane?"

Note: YouGov is an international online research data and analytics technology group.


Sources: <https://today.yougov.com/topics/politics/survey-results/daily/2023/01/02/fd798/3>

www.nzherald.co.nz/travel/50-of-men-surveyed-think-they-could-land-a-passenger-plane-experts-disagree/2SGKGXCJLVAEZJUUS4MUZGR4A/#:~:text=50%25%20of%20men%20surveyed%20think,Experts%20disagree%20%2D%20NZ%20Herald



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Roughly 1 in 3 Americans (32%) – including nearly half of men (46%) – are confident they could safely land a passenger airplane in an emergency situation, relying only on the assistance of air traffic control. Just 1 in 5 women say the same.

today.yougov.com/topics/politic...

How confident are you that you could safely land a passenger airplane in an emergency situation, relying only on the assistance of air traffic control?

	All	Male	Female
Very confident	13%	20%	7%
Somewhat confident	19%	26%	13%
Not very confident	17%	18%	16%
Not at all confident	42%	28%	55%
Not sure	9%	9%	10%

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today.yougov.com

RESOURCE THREE (b): DO YOU THINK YOU COULD SAFELY LAND A PLANE AFTER WATCHING THIS VIDEO?

Last year, a study from the University of Waikato used a similar scenario to examine overconfidence.

The researchers asked 780 subjects whether they could land a small commuter plane “without dying” or “as well as a pilot could”, if the pilot became incapacitated, and they were the only other person on board. Participants with a valid pilot’s licence or who had previously flown or landed a plane were excluded from the study.

Researchers showed some volunteers a nearly four-minute video of pilots landing a plane. The view from behind the flight deck obscured their hands. A veteran Air New Zealand pilot dismissed the video as “100 percent useless” as an instructional tool – which was the point. Other participants did not watch the quasi-tutorial.

Researchers found watching the video inflated people’s confidence that they could land a plane, with about a quarter of participants more than 60 per cent confident, and half at least 30 per cent confident.

Figure 1 below summarises how confident participants were to land a plane under the different scenarios.

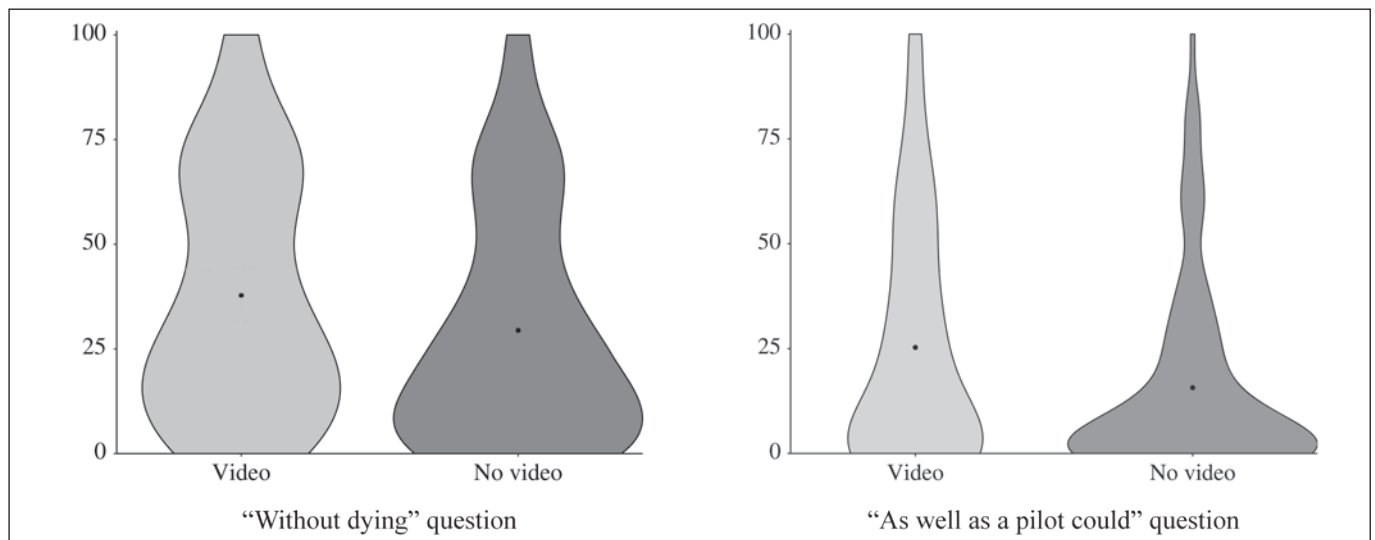


Figure 1: Participants’ confidence ratings for the standard “without dying” and the higher standard “as well as a pilot could” split by condition (video, no video). Median shown as a point on each graph.

Sources: <https://www.washingtonpost.com/travel/2023/03/22/how-hard-is-it-land-plane/>

<https://today.yougov.com/topics/politics/survey-results/daily/2023/01/02/fd798/3>

<https://www.stuff.co.nz/travel/news/128070712/do-you-think-you-could-safely-land-a-plane-after-watching-this-video>

<https://royalsocietypublishing.org/doi/10.1098/rsos.211977>

91584R

SUPERVISOR'S USE ONLY

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Draw a cross through the box (☒) if you have NOT written in this booklet

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Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 3 Mathematics and Statistics (Statistics) 2024

91584 Evaluate statistically based reports

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Evaluate statistically based reports.	Evaluate statistically based reports, with justification.	Evaluate statistically based reports, with statistical insight.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

Pull out Resource Booklet 91584R from the centre of this booklet.

Make sure that you have the Formulae and Tables Booklet L3–STATF.

Show ALL working.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (☒). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

QUESTION TWO: SOCKS-OVER-SHOES PROVEN AS MEANS OF REDUCING WINTER FALLS

Refer to Resource Two in the resource booklet to answer the following question parts.

- (a) The study reported results on three outcome variables including: self-rated slipperiness, observer-rated slipperiness, and the time it took to descend the slope.

Discuss why the researchers chose to use self-rated slipperiness as their primary outcome instead of the time it took to descend the slope.

- (b) Identify the explanatory and response variables for this study.

Explanatory variable: _____

Response variable: _____

- (c) It was not possible to blind the participants or the outcome assessors to the treatment allocation in this study.

- (i) Describe why blinding was not possible in this situation.

- (ii) Discuss TWO measures that the researchers used in this study to minimise the impact of not blinding the participants and, for each, describe how these measures may have helped minimise bias in this study.

Measure one: _____

Measure two: _____

- (d) Recruiters for the study administered a baseline questionnaire to participants, which included details about potential confounding variables, shown in Table 2(a).

Discuss TWO of these variables and, for each, describe how they may have been confounding, and their potential effect on the findings of this study.

Variable one: _____

Variable two: _____

**QUESTION THREE: 50% OF MEN SURVEYED THINK THEY COULD
LAND A PASSENGER PLANE – EXPERTS DISAGREE**

Refer to Resource Three in the resource booklet to answer the following question parts.

- (a) The *New Zealand Herald* headline for Resource Three (a) is: “50% of men surveyed think they could land a passenger plane – experts disagree.”

Explain how evidence from this report has been used to generate this headline.

- (b) Identify one of the survey percentages in the YouGov study, and explain why it would not be appropriate to use the rule of thumb for the margin of error to construct an approximate 95% confidence interval for the population proportion, using this survey percentage.

*Question Three continues
on the next page.*

- (c) Resource Three (a) and Resource Three (b) are from two different studies.

Discuss the main differences between the designs of these two studies.

Support your answer with statistical reasoning, including clearly justifying the study designs, the types of inferences (claims) that can be made, and the assumptions needed to do so.

Resource Three (a): YouGov study

Study design: _____

Inferences: _____

Assumptions: _____

Resource Three (b): University of Waikato study

Study design: _____

Inferences: _____

Assumptions: _____

- (d) In Resource Three (b), the study researchers concluded that “We found watching the video inflated people’s confidence that they could land a plane.”

Using evidence from Figure 3, write TWO comparative comments that support the study researchers’ conclusion.

Comment one:

Comment two:

- (e) In the study from Resource Three (b), participants either watched a video or not, then were told: “Now we’re going to ask you a few questions. Don’t try to analyse and puzzle things out – just go with your gut feel or hunch. Respond as quickly as possible within a couple of seconds. Remember this is an emergency situation.”

Participants answered the following questions in this order:

Q1: “How confident are you that you would be able to land the plane without dying?”
(0 = not at all confident, 100 = very confident)

Q2: “How confident are you that you would be able to successfully land the plane as well as a pilot could?” (0 = not at all confident, 100 = very confident).

In a second repeated study (with new participants), the researchers randomised the order of these two questions, with approximately half of the participants asked the questions in the order above, and half asked in the opposite order.

Explain why the researchers asked the questions in different orders.
