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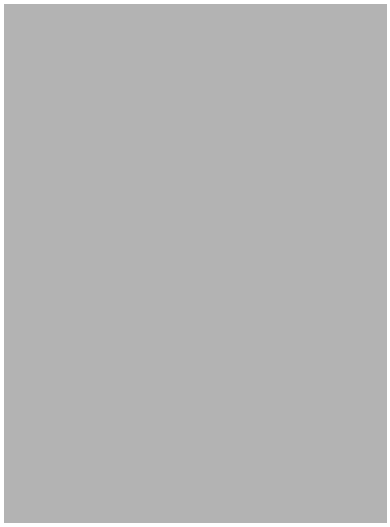
RESOURCE TWO: SOCKS-OVER-SHOES PROVEN AS MEANS OF REDUCING WINTER FALLS



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 (*n* = 14)	Control group (*n* = 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 6–12 months > 12 months	 3 (21) 9 (64) 2 (14)	 2 (13) 9 (60) 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 (*n* = 14)	Control group (*n* = 15)
Primary outcome (mean (SD)) Self-rated slipperiness	1.6 (1.14)	2.9 (1.32)
Secondary outcomes (mean (SD)) Observer-rated slipperiness Seconds to descend slope	 1.6 (0.66) 37.7 (9.36)	 2.3 (1.07) 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

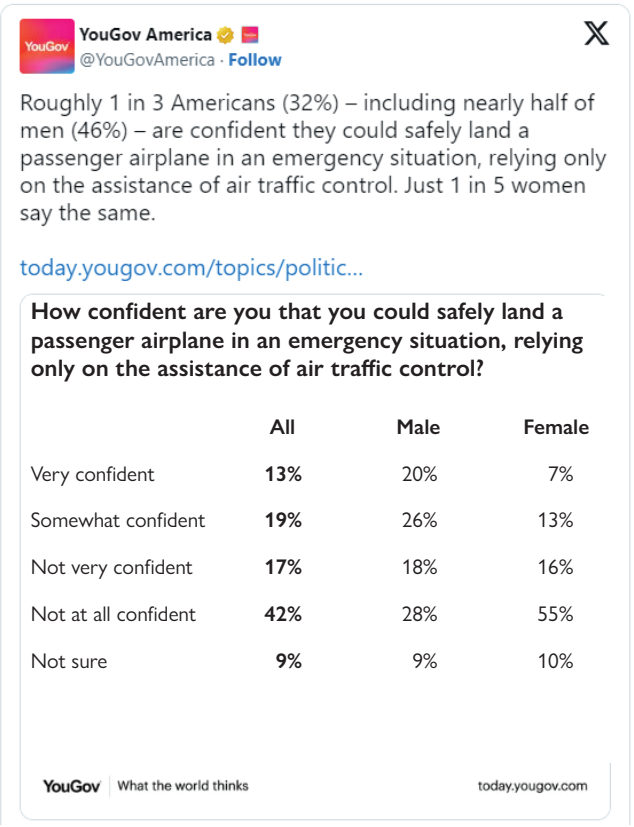
RESOURCE THREE (a): 50% OF MEN SURVEYED THINK THEY COULD LAND A PASSENGER PLANE – EXPERTS DISAGREE

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/2SGKGXCJLVAEZJUUQS4MUZGR4A/#:~:text=50%25%20of%20men%20surveyed%20think,Experts%20disagree%20%2D%20NZ%20Herald

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.

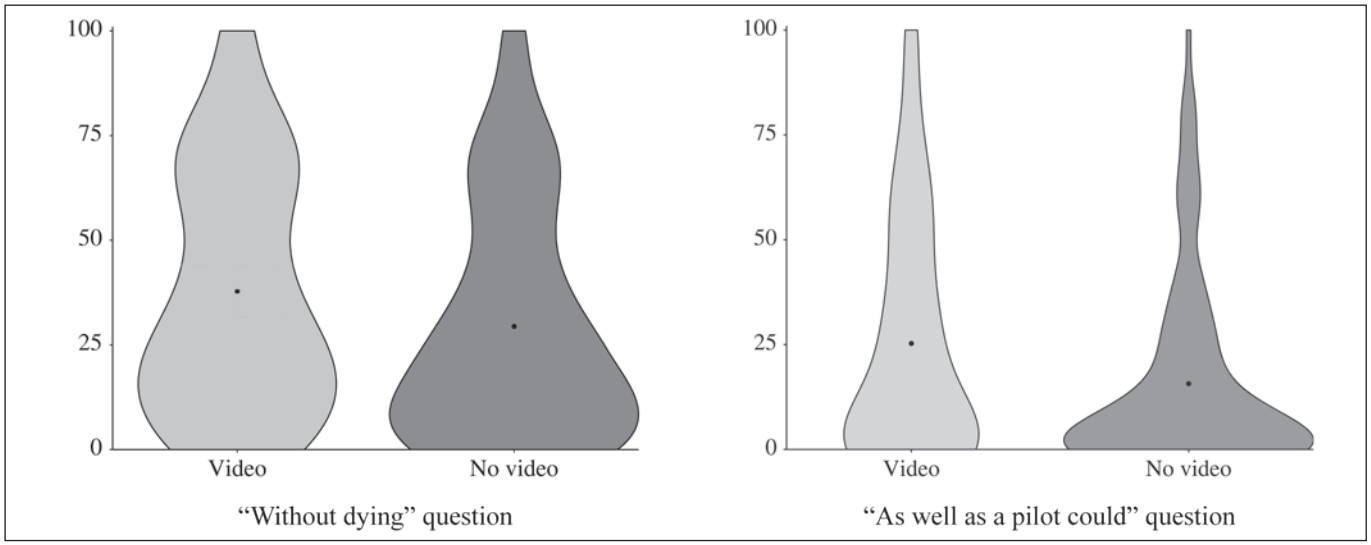


Figure 1: Participants' confidence ratings for the standard "without dying" and the higher standard "as well as a pilot could" split by condition (video, no video). Median shown as a point on each graph.

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