

CBMM Journal club: 14 August 2023
Presenter: Hassan Andrabi

When knowledge hurts: humans are willing to receive pain for obtaining non-instrumental information

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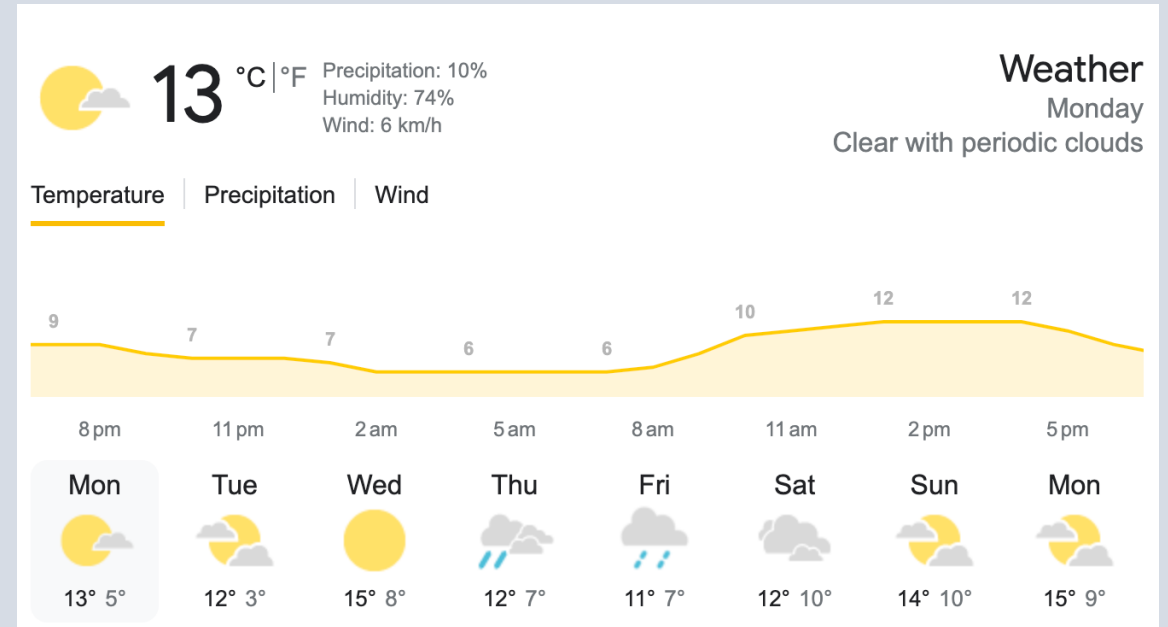
Centre for Brain, Mind and Markets





Overview

- The drive to understand the world is an important aspect of human (and other animal) cognition.
- What makes information valuable?
 - Instrumental value
 - Non-instrumental value
- Research question: are humans willing to accept pain as a cost to obtain non-instrumental information?



UoM-WAM-Spam Public

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main 2 branches 0 tags

Go to file Add file Code

matomactical Update README.md 6112218 on Dec 1, 2021 110 commits

- notify Adding slack incoming webhook push notification support 3 years ago
- .gitignore elaborate instructions in readme 4 years ago
- LICENSE revive project, reimplement most of script 4 years ago
- README.md Update README.md 2 years ago
- messages.py fix result diff bugs 4 years ago
- wamspam.py merge pr#23 3 years ago

README.md

UoM WAM Spam

The official results release date is usually about two weeks after the end of the exam period. In practice, subject marks become visible a week or two earlier than the official release date, and can be inferred even earlier by detecting a change in calculated WAM (Weighted Average Mark) as soon as the results are in the system (days before the results themselves are made visible on the results page).

Contributors 7

Languages

- Python 100.0%



Methodology

Participants:

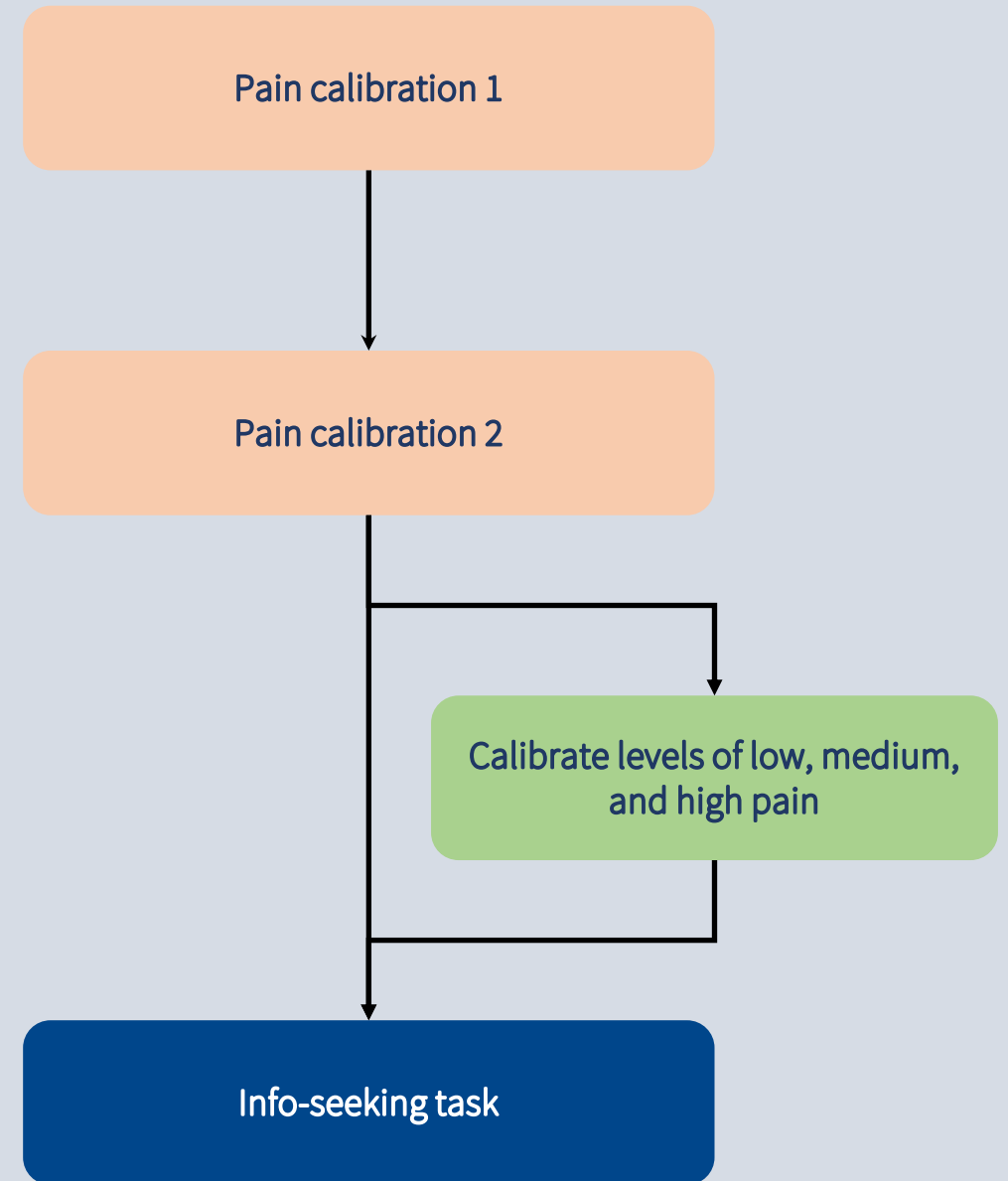
- Forty human participants (28F, 12M), aged 18-37 years ($\mu = 23.03$, $\sigma = 4.58$)

Payment:

- \$15 show-up fee
- Participants told they could win up to \$10 during the experiment (everyone actually paid \$10 in the end)

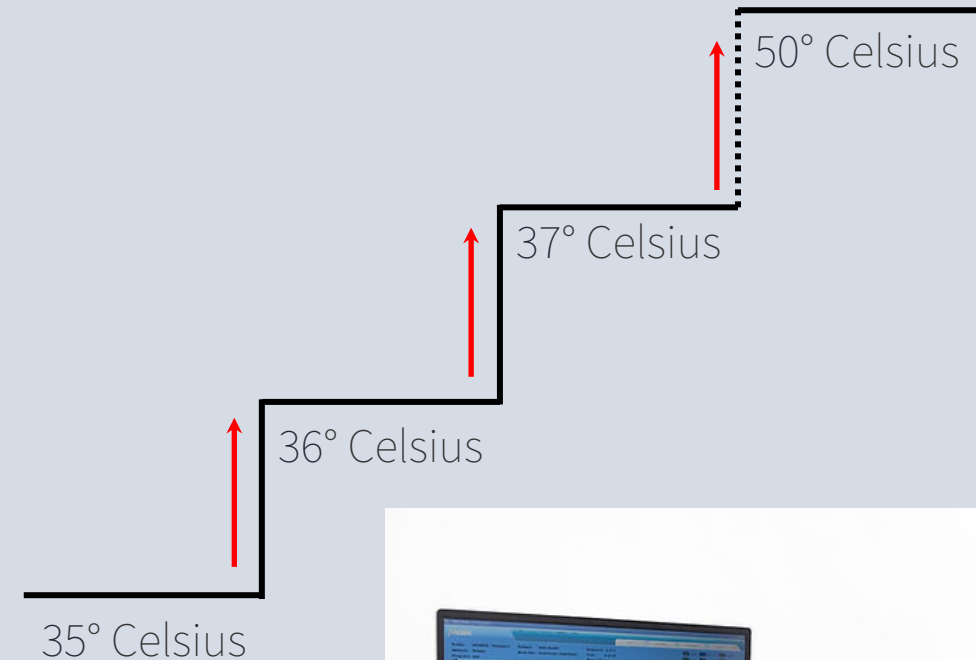
Stimuli:

- Pain calibration to determine participant thresholds of low/moderate/high pain.
- Information seeking trials to accept low/moderate/high pain in exchange for immediate information about the outcome of a coin flip lottery.



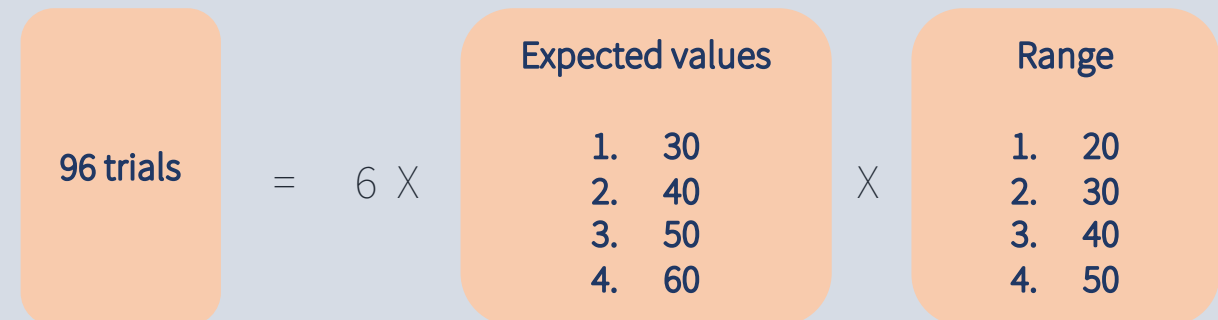
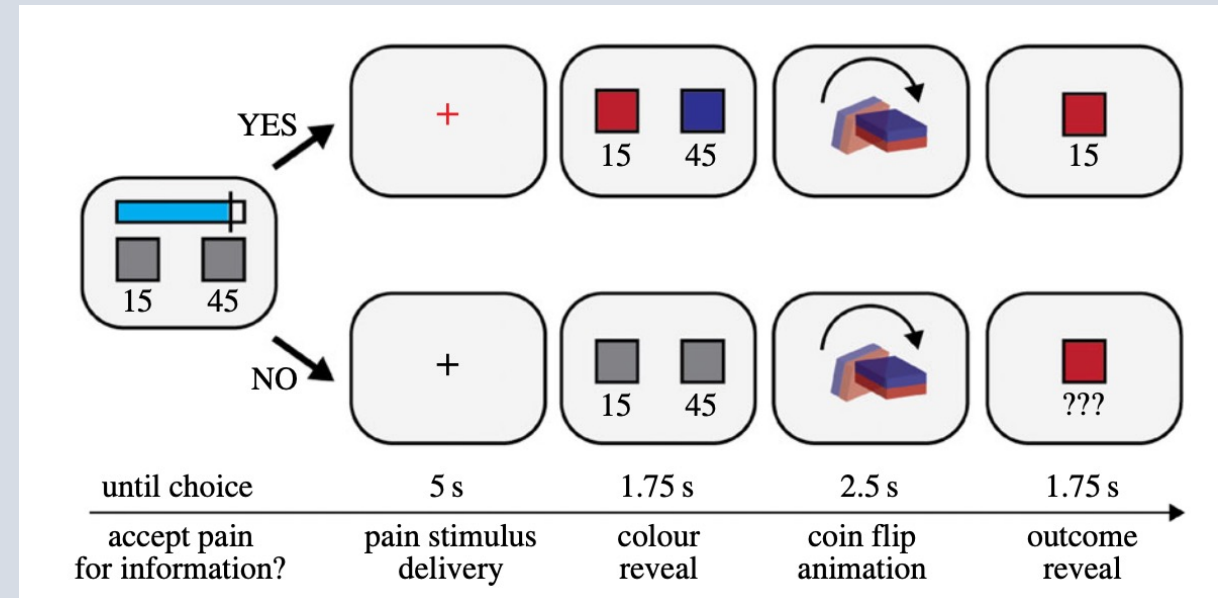
Methodology: Pain calibration

- Ascending staircase starting from 35° Celsius, and increasing by 1 ° until participant's rating of low/moderate/high pain reached
- Staircase repeated twice:
 - First block to accustom participants to stimuli
 - Second block to determine pain thresholds to use in remainder of experiment
- After calibration, participant's given random sequence of nine thermal stimuli (three corresponding to each pain level). All participants were correctly able to distinguish thresholds without errors.



Methodology: Information-seeking task

- Coin with coloured faces, where each colour is associated with a unique reward
- Participants shown the point values that could be earned by the coin
- Participants not shown the colour-reward mapping
- Participants offered a ‘pain-level’, which they could accept to receive pain in exchange for learning the reward-colour mapping
- Participants perform 6 block of 16 trials
 - 4 levels of expected values
 - 4 levels of range



Results: pain stimulation

Low pain:

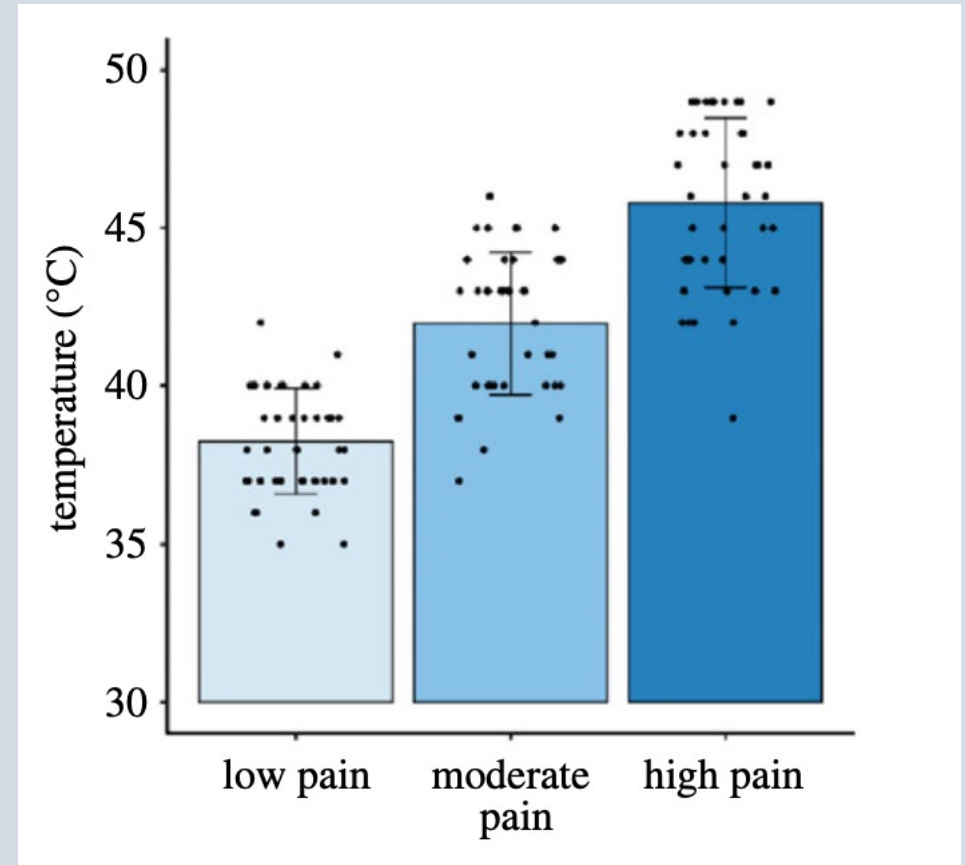
- Temperature: $\mu = 38.3^{\circ}\text{C}$, $\sigma = 1.66^{\circ}\text{C}$
- Pain rating: $\mu = 5.2$, $\sigma = 1.34$

Moderate pain:

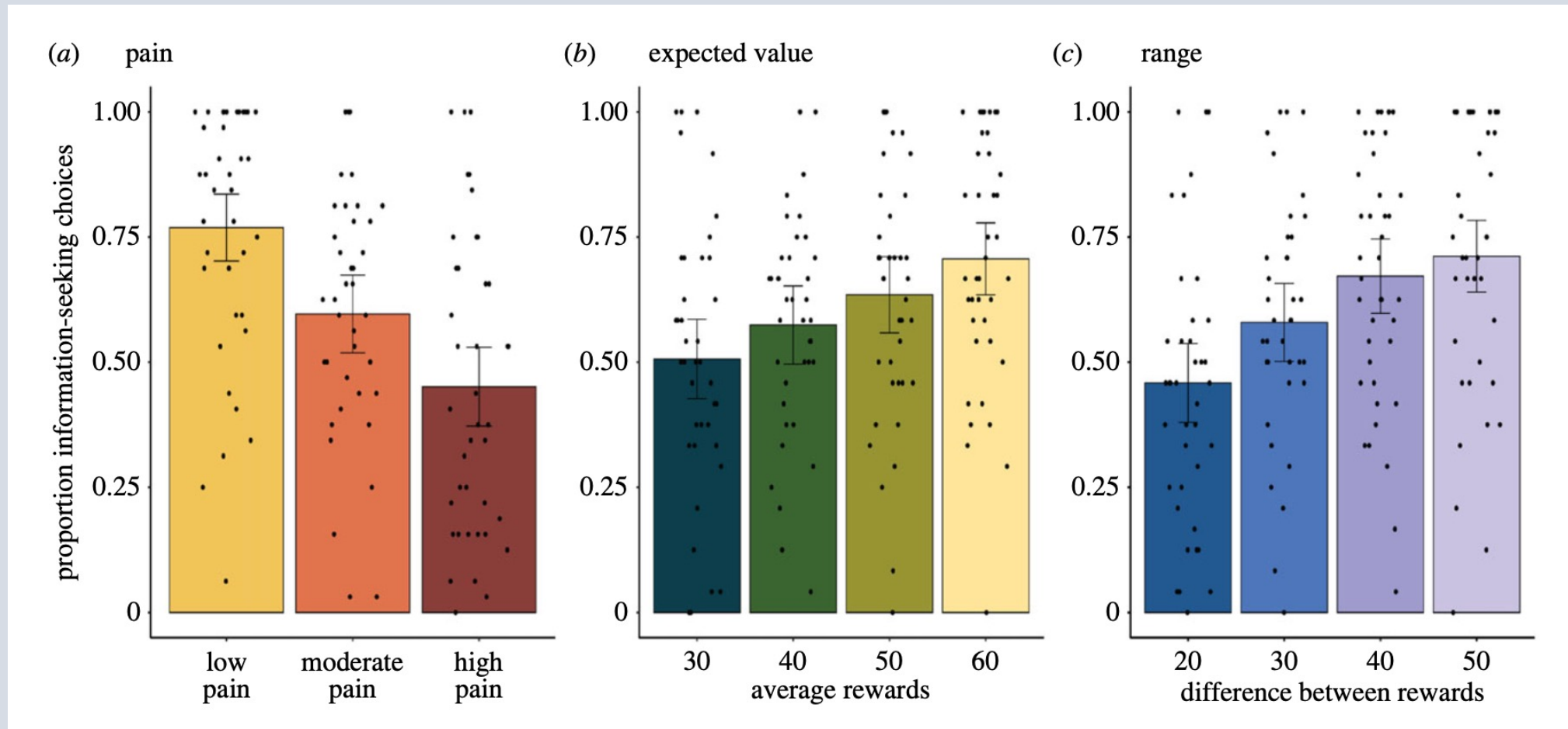
- Temperature: $\mu = 42.0^{\circ}\text{C}$, $\sigma = 2.26^{\circ}\text{C}$
- Pain rating: $\mu = 10.1$, $\sigma = 1.5$

High pain:

- Temperature: $\mu = 45.8^{\circ}\text{C}$, $\sigma = 2.69^{\circ}\text{C}$
- Pain rating: $\mu = 14.9$, $\sigma = 1.53$



Results: information-seeking



Interpreting results

- Participants accept pain for non-instrumental information at all levels of pain.
- The level of pain, the expected value, and the range between rewards independently predict decisions to seek information
- For a rational agent, none of these factors should increase the desire for non-instrumental information
- Why do participants seek non-instrumental information?
 - Immediate reduction of uncertainty (analgesic effect)
 - Desire to be in positive belief states





Extensions

- Do certain types of people seek non-instrumental information more than others?
 - Q1: How do individual-specific characteristics of influence information-seeking behaviour?
- How does the appetitive/aversive nature of rewards influence non-instrumental information seeking behaviour?
 - Q2: Are people willing to pay for non-instrumental information about the outcome of lottery delivering various levels of pain?
 - Q3: How does information seeking behaviour change when monetary rewards can be negative?

The screenshot shows a GitHub repository page for 'UoM-WAM-Spam'. The repository is public and has 4 watchers, 22 forks, and 61 stars. The main content area shows a list of files: notify, .gitignore, LICENSE, README.md, messages.py, and wampam.py. The README.md file is selected, showing the repository name 'UoM WAM Spam' and a description: 'The official results release date is usually about two weeks after the end of the exam period. In practice, subject marks become visible a week or two earlier than the official release date, and can be inferred even earlier by detecting a change in calculated WAM (Weighted Average Mark) as soon as the results are in the system (days before the results themselves are made visible on the results page).' Below the README is a comment thread with three messages:

- Lachie McKay**: Check out this, it like does anxiety for us **Estefania Cordoba Daniyal** **Abid Steven Zhang** (3 reactions)
- Daniyal Abid**: **Lachie McKay** look I enjoy my happiness, so this is a no from me (1 reaction)
- Estefania Cordoba**: hard pass thanks (1 reaction)

The bottom of the screenshot shows a reply input field for 'Reply to Lachie McKay...' with icons for emojis, GIFs, and other actions.