Language as Lure: A Naturalistic Study on Pasifika Phishing Susceptibility

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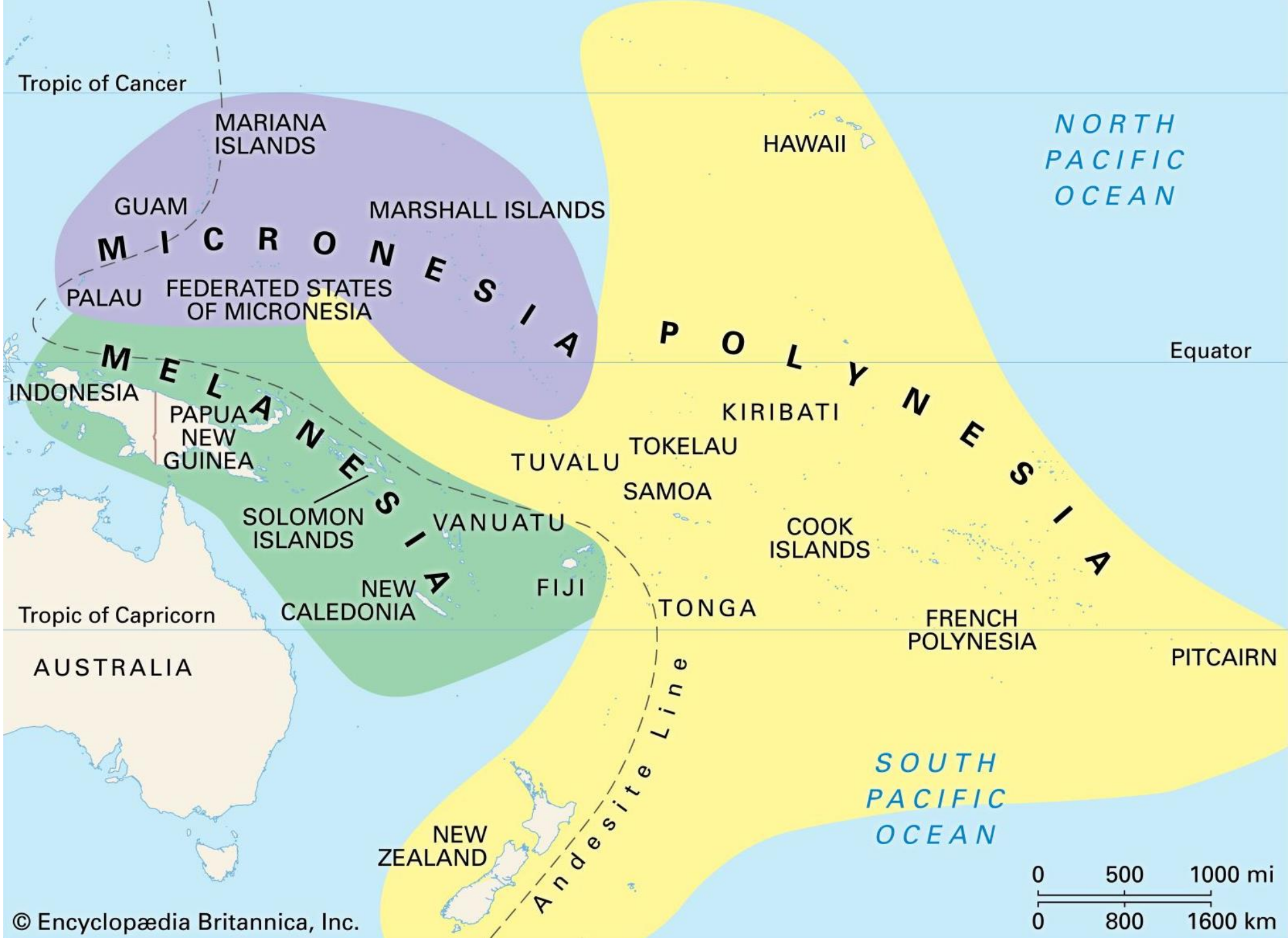
Waipapa Taumata Rau University of Auckland





Pasifika

(Peoples of the Pacific Islands)



Motivation



NEW ZEALAND

Scams targeting Pasifika people on the rise - community leaders

8:44 am on 19 November 2019

Share this

Jessie Chiang, Reporter
@je_chiang Jessie.Chiang@rnz.co.nz

Pasifika community leaders in Auckland are warning about a rise in scams and are urging people not to be ashamed to speak up.



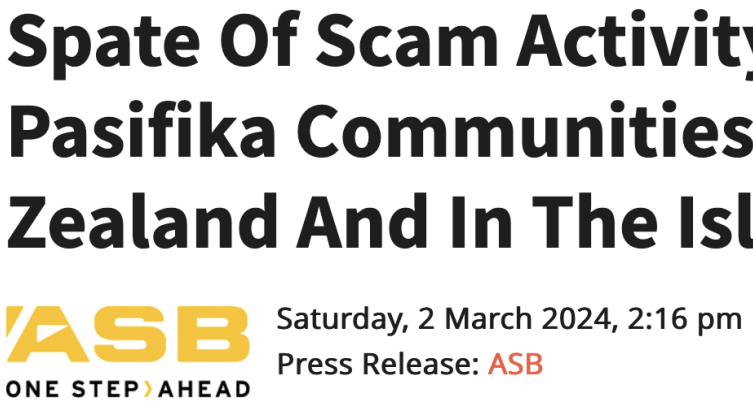
MARKETS

Crypto Scams Targeting Pacific Communities on the Rise, Say New Zealand Regulators

A rise in cryptocurrency and coronavirus investment scams has prompted authorities to launch an awareness campaign.

BY SEBASTIAN SINCLAIR

Updated Sep 14, 2021, 8:40 p.m. Published May 13, 2020, 9:17 p.m.



Spate Of Scam Activity Hitting Pasifika Communities In New Zealand And In The Islands

ASB
ONE STEP AHEAD

Saturday, 2 March 2024, 2:16 pm
Press Release: ASB

Motivation

- Rise in scams targeting Pasifika people
- Limited computational resources exist for Pasifika languages
- LLMs introduce new phishing threats

Background

- Linguistic and cultural factors affect phishing vulnerability
  - Low individualism → increased phishing susceptibility [1, 2]
  - South Korean participants more susceptible to native language phishing emails [3]

[1] Butavicius et al. Understanding susceptibility to phishing emails: Assessing the impact of individual differences and culture. In HAISA, 2017.
[2] Tembe et al. Phishing in international waters: exploring cross-national differences in phishing conceptualizations between Chinese, Indian and American samples. In Proceedings of the 2014 Symposium and Bootcamp on the Science of Security, 2014.
[3] Hasegawa et al. Why they ignore English emails: The challenges of non-native speakers in identifying phishing emails. In SOUPS 2021.

Research Question

How do linguistic and cultural cues in phishing emails influence susceptibility among Pasifika people?

Addressed through simulated phishing campaign

Contributions

- First simulated phishing campaign study to
  1. Focus on Pasifika people
  2. Demonstrate a Foreign Language Effect in phishing
  3. Isolate and compare the influence of different natural languages on susceptibility

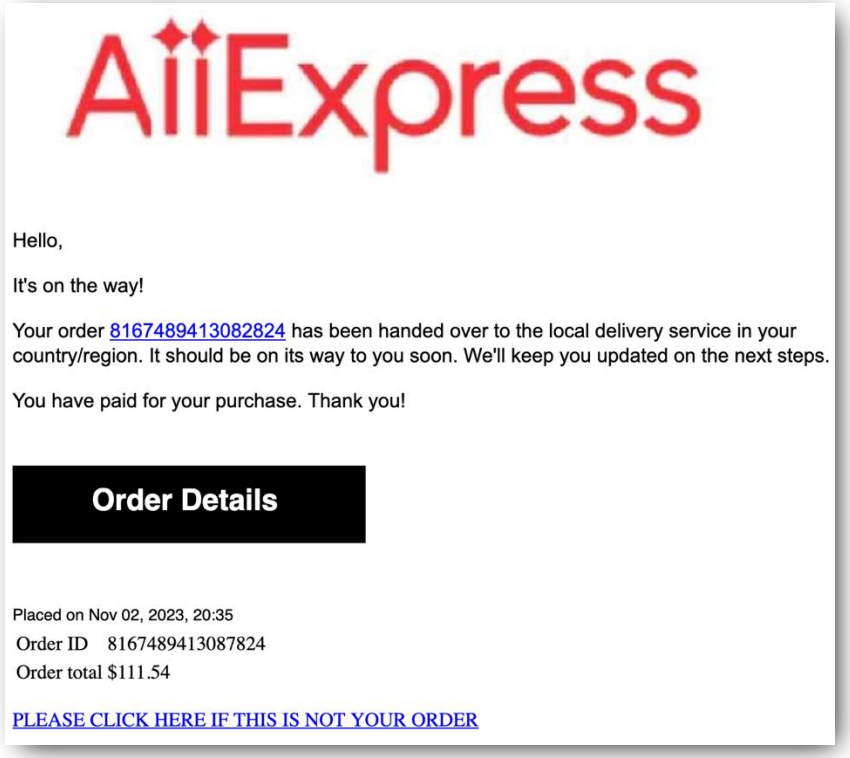
- Natural language can be leveraged to increase phishing susceptibility

Study Design

- **Simulated Phishing Study**
  - 2,000 government employees in a Melanesian country
  - One email per person per month; four months
  - 4 email types × 2 language variants (English & NL)
  - Each month half saw English, half NL
    - Alternating assignment
  - Recorded ‘email opened’ and ‘clicked link’ events
- **Questionnaire**
  - Demographics, Likert scale and open-ended questions



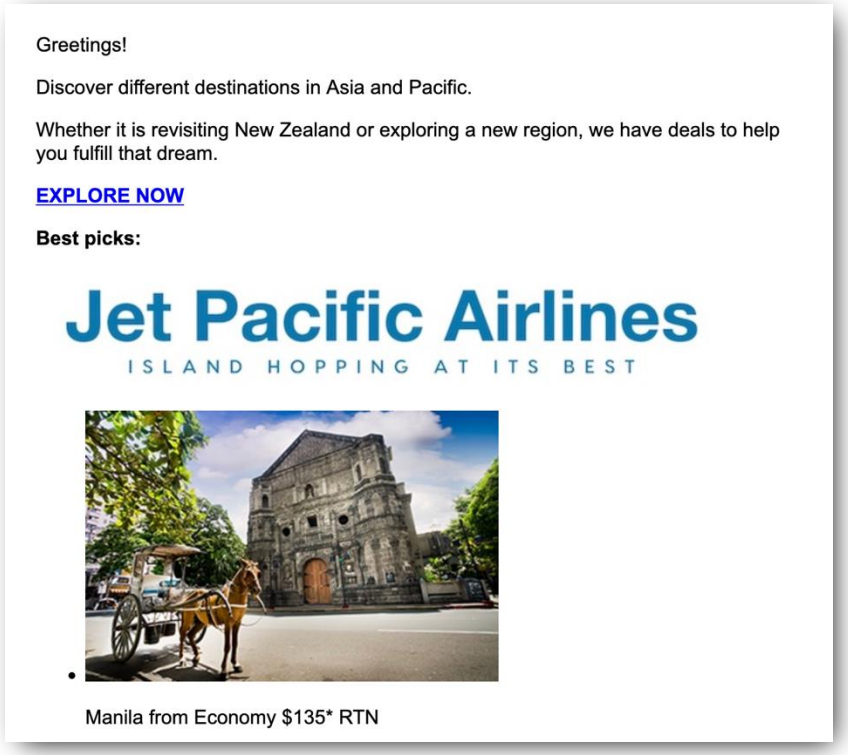
Email Category 1: Commercial



AiiExpress

Sender: info@aiiexpress.store

Subject: Aii Express - Your Order Is Here

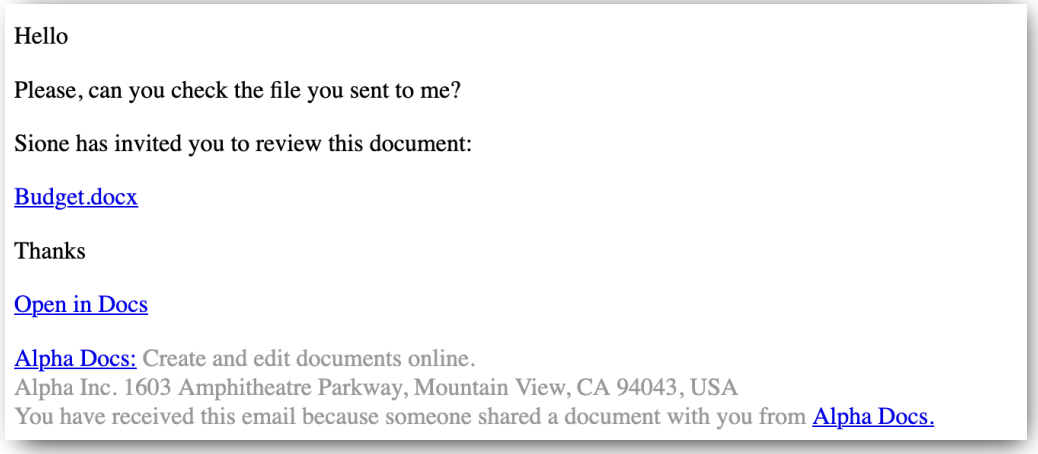


Jet Pacific

Sender: info@jetpacific.online

Subject: Jet Pacific Airlines - Crazy Relaunch Prices

Email Category 2: Personal Requests for Help



Hello

Please, can you check the file you sent to me?

Sione has invited you to review this document:

Budget.docx

Thanks

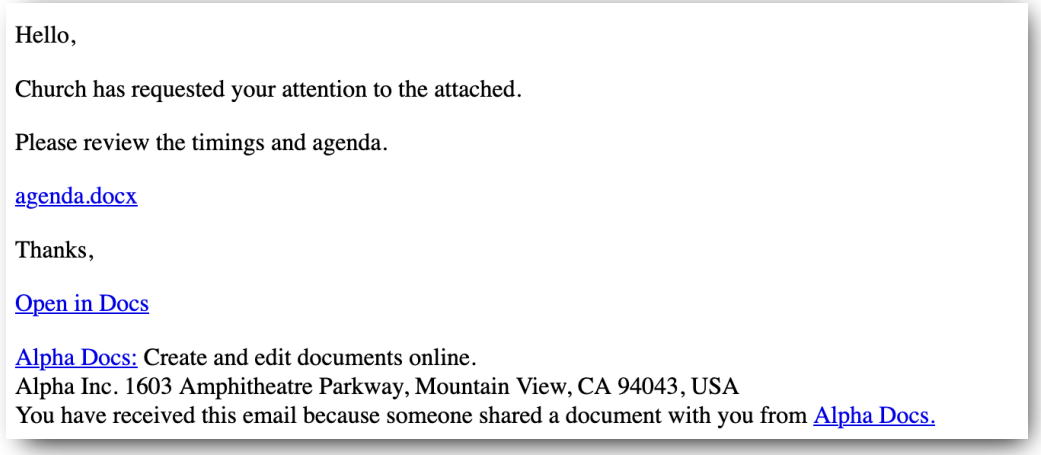
Open in Docs

Alpha Docs: Create and edit documents online.
Alpha Inc. 1603 Amphitheatre Parkway, Mountain View, CA 94043, USA
You have received this email because someone shared a document with you from Alpha Docs.

‘Budget’

Sender: info@alphabudgets.online

Subject: Budget Reporting.docx - Invitation to edit



Hello,

Church has requested your attention to the attached.

Please review the timings and agenda.

agenda.docx

Thanks,

Open in Docs

Alpha Docs: Create and edit documents online.
Alpha Inc. 1603 Amphitheatre Parkway, Mountain View, CA 94043, USA
You have received this email because someone shared a document with you from Alpha Docs.

‘Church’

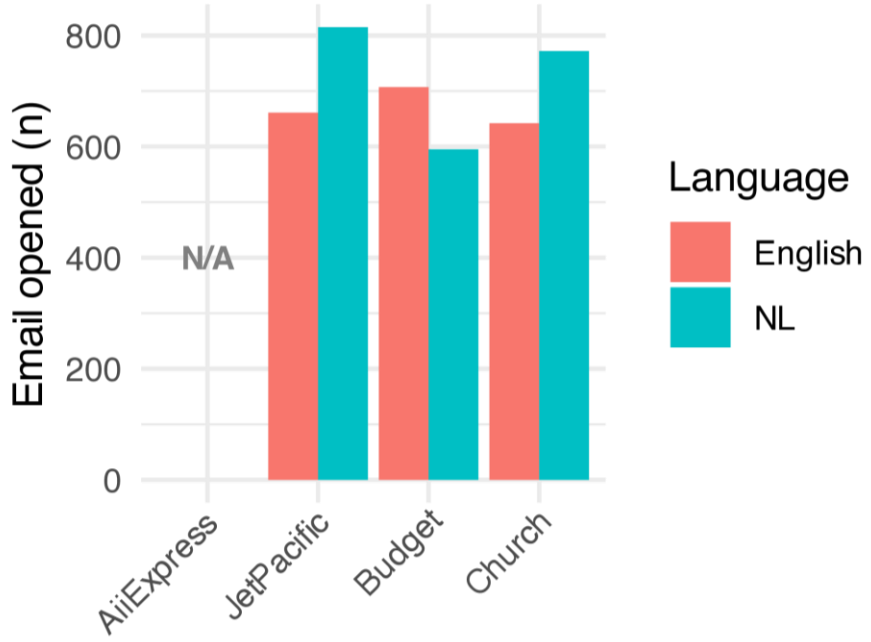
Sender: info@church-org.space

Subject: Please Review Church Document

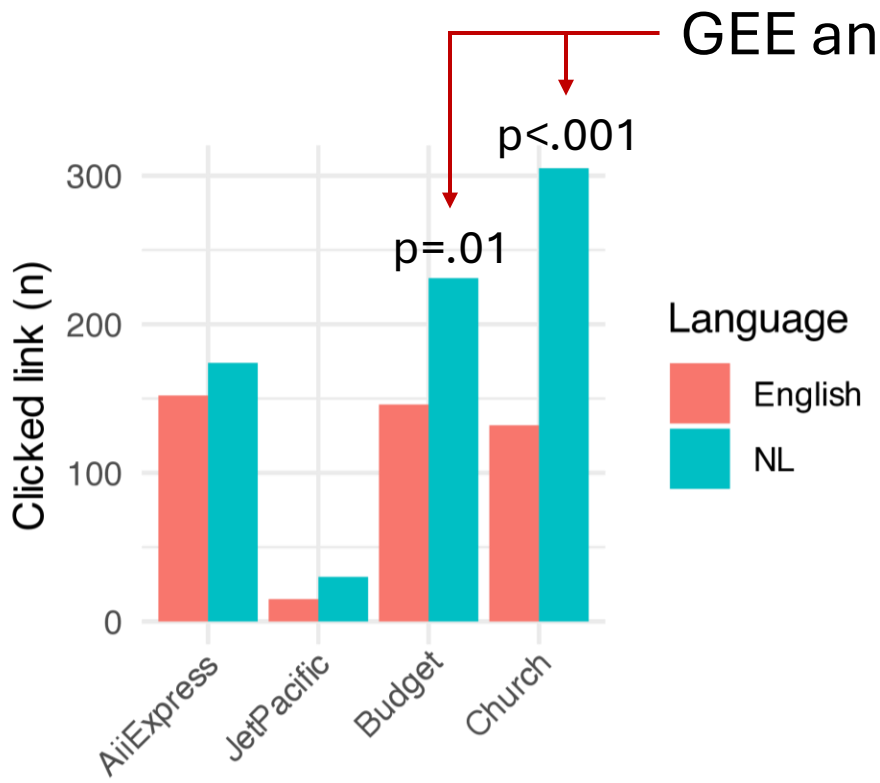
Open and Click Rates

	Opened Email	Clicked Link
Overall	69.9%	14.5%
English	67.0%	11.1%
NL	72.7%	18.5%

Open and Click Counts



Email Opened Counts



Clicked Link Counts

Questionnaire Results

- **Language**
  - 90% describe NL competency as “fluent”
  - NL emails rated as more *personal*, *understandable*, *trustworthy*, *curiosity-inducing* than those in English
  - Deep resonance with NL:
    - “[NL] is the national language of our people”
    - “[NL] … is our identity”
    - “it is the daily language we use in [country]”



Foreign Language Effect

Robust finding from cognitive psychology / neurolinguistics

- Natural language influences decision-making

Native Language

- More emotional / moral decisions

Non-Native Language

- More ‘coldly rational’ decisions

Foreign Language Effect

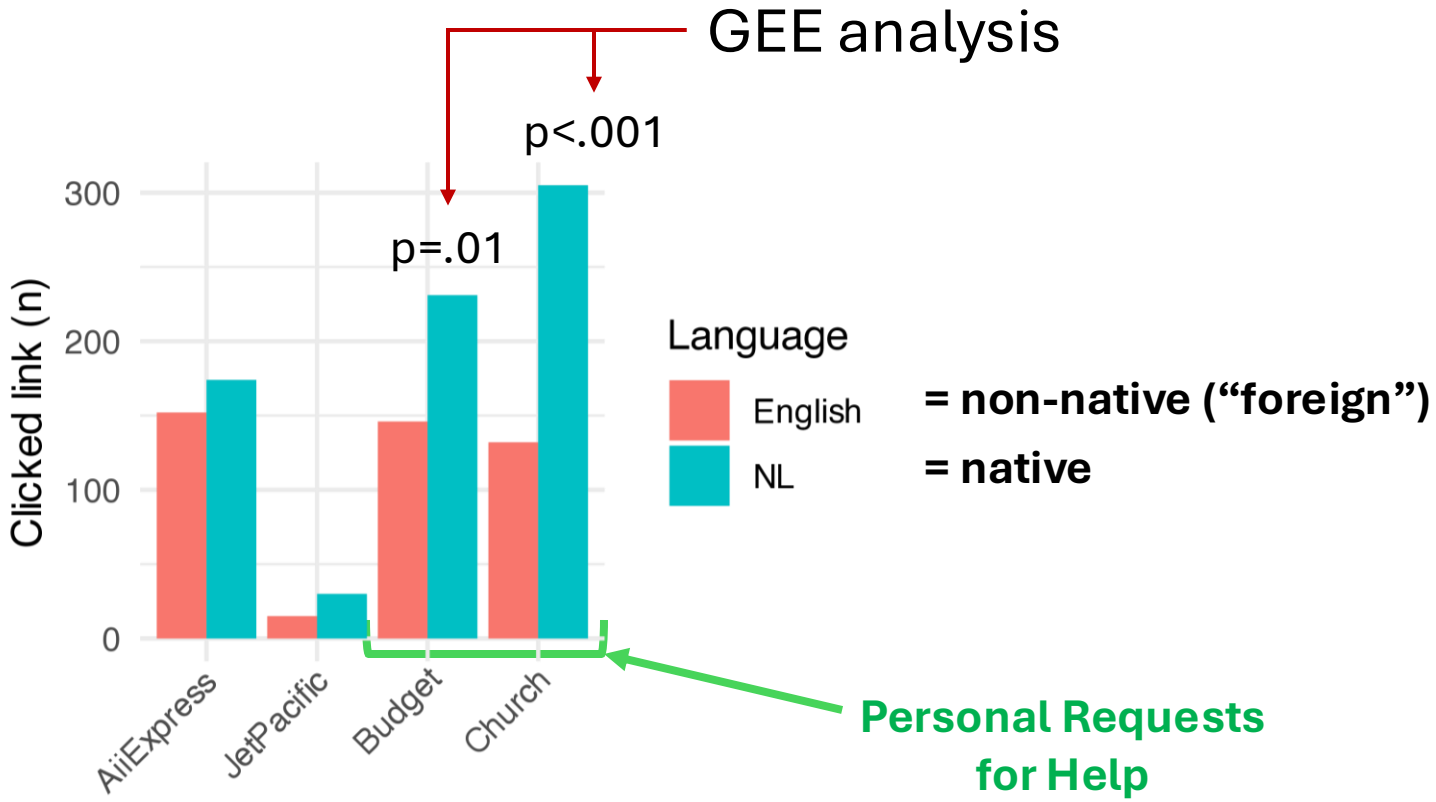
Proposed explanations [5]:

1. **Emotionality**
2. **Access to cultural and moral norms**

[5] Circi et al. The foreign language effect on decision-making: A meta-analysis. Psychonomic Bulletin & Review, 2021.

Our study shows a Foreign Language Effect for phishing

- When emails contain request for help



Help-Request Phishing

- **Emotional component**:
  - Works by triggering sympathetic response in target
- **Moral/cultural component:**
  - Helping others is cultural universal [6]
  - *Increased* emphasis in collectivist cultures [7]
  - *Intense* emphasis in Melanesian culture [8]
    - *Wantok* social network system

Either (or both) could play a role in the FLE in our study



[6] Rossi et al. Shared cross-cultural principles underlie human prosocial behavior at the smallest scale. Scientific Reports, 2023.
[7] Podsiadlowski & Fox. Collectivist value orientations among four ethnic groups: Collectivism in the New Zealand context. New Zealand Journal of Psychology, 2011.
[8] Monsell-Davis. Urban exchange: safety-net or disincentive? Wantoks and relatives in the urban pacific. Canberra Anthropology, 1993.

Future Research

- Test culture vs. emotionality hypotheses
- **Cross-cultural studies:**
  - Is this FLE specific to Melanesian, Pasifika, or collectivist cultures, or is it universal?
  - Are different cultures susceptible to different types of attacks?

Recommendations for Researchers

- **Non-native linguistic material** *may confound results*
- Collect **language proficiency** and **age of initial learning** to control

Thank You!

Questions, thoughts, or feedback?

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University of Auckland



References

[1] Marcus A Butavicius, Kathryn Parsons, Malcolm R Pattinson, Agata McCormac, Dragana Calic, and Meredith Lillie. Understanding susceptibility to phishing emails: Assessing the impact of individual differences and culture. In HAISA, pages 12–23, 2017.

[2] Rucha Tembe, Olga Zielinska, Yuqi Liu, Kyung Wha Hong, Emerson Murphy-Hill, Chris Mayhorn, and Xi Ge. Phishing in international waters: exploring cross-national differences in phishing conceptualizations between Chinese, Indian and American samples. In Proceedings of the 2014 Symposium and Bootcamp on the Science of Security, pages 1–7, 2014.

[3] Ayako A Hasegawa, Naomi Yamashita, Mitsuaki Akiyama, and Tatsuya Mori. Why they ignore English emails: The challenges of non-native speakers in identifying phishing emails. In Seventeenth Symposium on Usable Privacy and Security (SOUPS 2021), pages 319–338, 2021.

[4] Costa, A., Foucart, A., Hayakawa, S., Aparici, M., Apesteguia, J., Heafner, J., & Keysar, B. (2014). Your morals depend on language. *PloS one*, *9*(4).

[5] Circi, R., Gatti, D., Russo, V., & Vecchi, T. (2021). The foreign language effect on decision-making: A meta-analysis. *Psychonomic Bulletin & Review*, *28*(4), 1131-1141.

[6] Rossi et al. Shared cross-cultural principles underlie human prosocial behavior at the smallest scale. Scientific Reports, 2023.

[7] Podsiadlowski & Fox. Collectivist value orientations among four ethnic groups: Collectivism in the New Zealand context. New Zealand Journal of Psychology, 2011.

[8] Monsell-Davis. Urban exchange: safety-net or disincentive? Wantoks and relatives in the urban pacific. Canberra Anthropology, 1993

Melanesian Art Sources

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- https://www.britannica.com/place/Pacific-Islands