



# Anticipating individual responses to precision psychiatry: The role of genetic literacy, cognitive styles, and personal values

---

Jose J. Morosoli Garcia, M.Sc.

2019 World Congress of Psychiatric Genetics  
29th October



# Disclosure

## **Funding**

This study was funded by the John Templeton Foundation (Genetics and Human Agency project).

## **Conflict of interest**

The authors declare that they have no conflict of interest.

# Context of the project

- Psychiatric genetics has undeniable personal and social ramifications (e.g., health behavior, personal identity, relationship with others, etc.).
- It's a *socio-scientific issue*: a "socially relevant, real-world problem that is informed by science, often including an ethical component, dividing public opinion" (Sadler 2004).
- Other socio-scientific issues: climate change, vaccination, or GMOs (Amin et al 2017, Kahan 2015).

# Context of the project

- Traditional science communication and outreach consisted in one-way (100%) literacy interactions. That is, *we the "experts" teach the public the "facts"*.
- But information is not simply taken "as it is". People strategically reject or adopt information about socio-scientific issues based on their values, fears, and needs (Bubela 2009).

# Context of the project

- Also, learning about genetics is associated with specific biases: we see the outcome as less changeable, discount additional causal explanations, a genetic basis means biological interventions, etc.. (Heine et al, 2019; Condit 2019).
- In summary, accurate and understandable communication is necessary, but we expect literacy not to be the only driver of attitudes.

# Present study

- Explore potential negative consequences regarding the availability of genetic risk information among general population.
- Identify personal characteristics that could help us communicate genetics better.
- Provide more references for levels of genetic literacy and attitudes in the general population.

# Key variables in our survey

## Genetics section

- **Perceived heritability** of the condition.
- Belief that **lifestyle** influence genetic predisposition for the condition.
- Themselves or relative with **diagnosis**.
- **Biological essentialism**: "There are types of people and these 'types' can be traced back to genetic causes").

## Cognitive traits section

- **Tolerance for uncertainty** (Need for Closure).
- Tendency to engage in **heuristic thinking** (Cognitive reflection).
- **Motivation** to engage in activities that involve **thinking** (Need for Cognition).

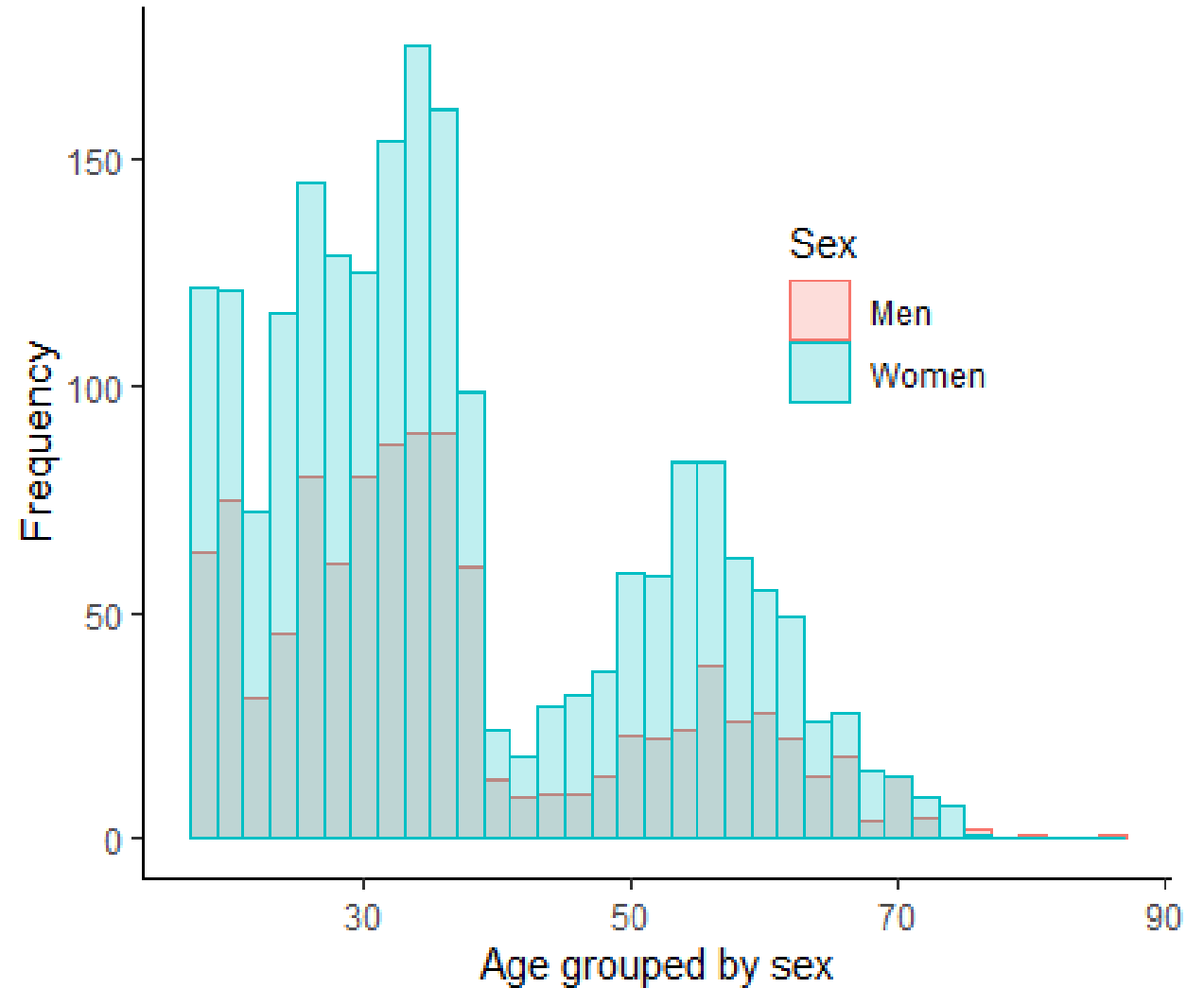
## Moral values section

- How do you decide if something is right or wrong (e.g., fairness, other's wellbeing).
- Credibility of science.

Note: Logistic regression analyses were run for each attitude-trait pair using these predictors.

# Australia (N=3168)

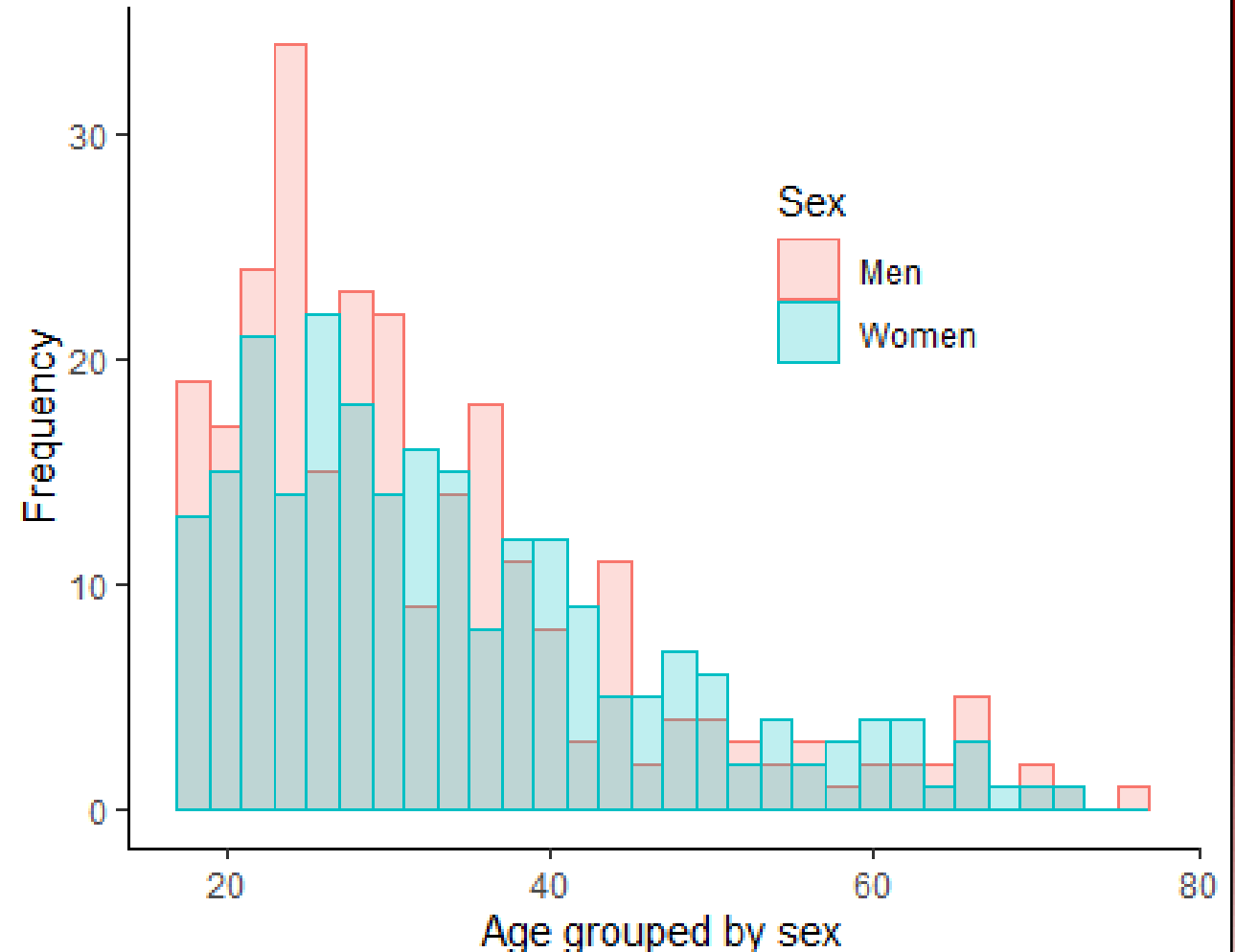
- Families participating in genetic studies at QIMR.
- 17 to 86 y.o. (M=37.5, SD=14.1).
- 66.5% women, and 57.5% with university degree.
- Genetic literacy:
  - 6.8% very poor
  - 30.3% poor
  - 48.3% fair
  - 14.5% good





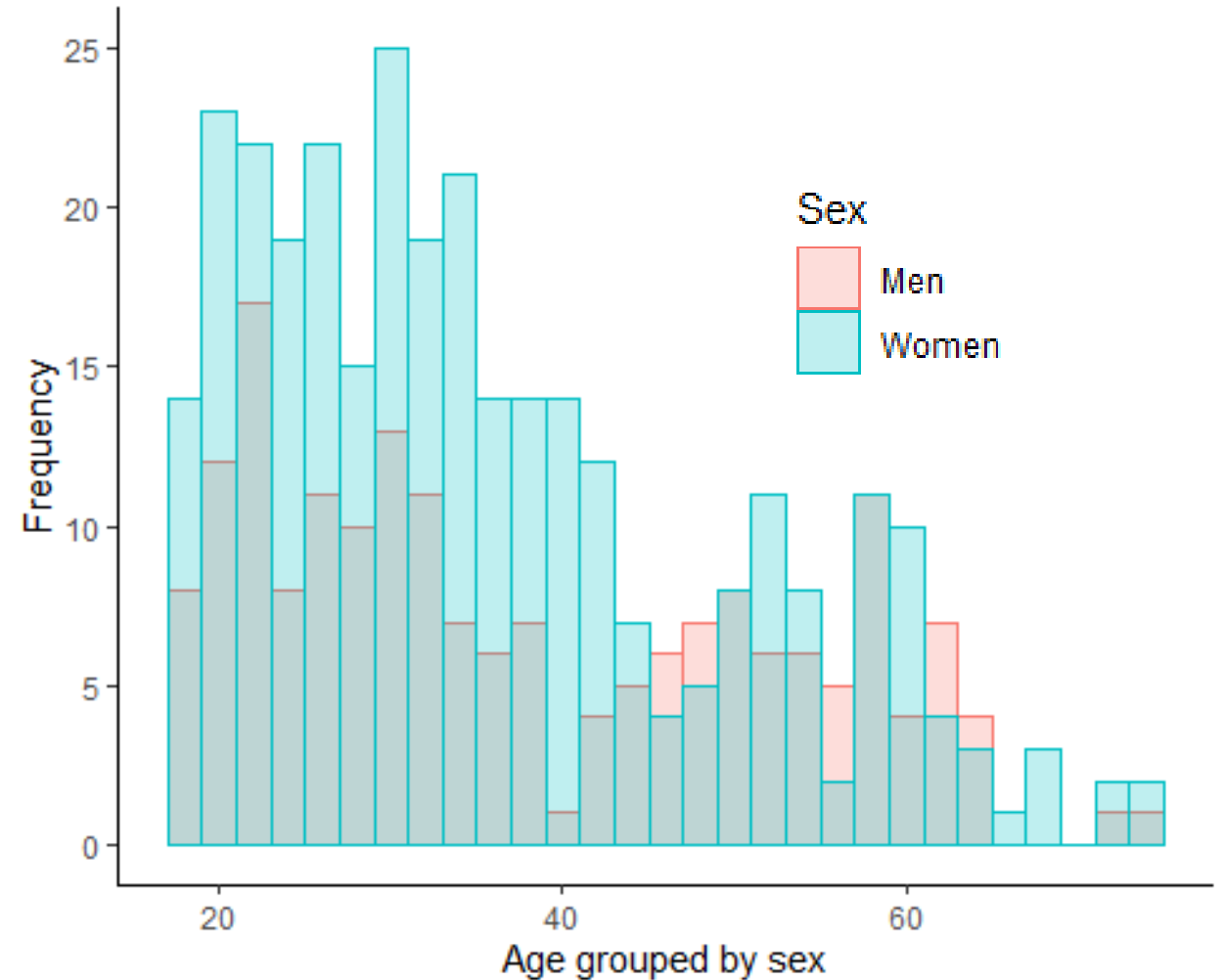
# United States (N=500)

- General population recruited via Prolific online survey platform.
- 18 to 76 y.o. (M=33.6, SD=12.4).
- 47.6% women and 47.6% with university degree.
- Genetic literacy:
  - 8.2% very poor
  - 33.4% poor
  - 51.6% fair
  - 6.8% good



# United Kingdom (N=501)

- General population recruited via Prolific online survey platform.
- 18 to 75 y.o. (M=37.1, SD=13.9).
- 62.9% women and 51.7% with university degree.
- Genetic literacy:
  - 5.4% very poor
  - 33.1% poor
  - 47.7% fair
  - 13.8% good

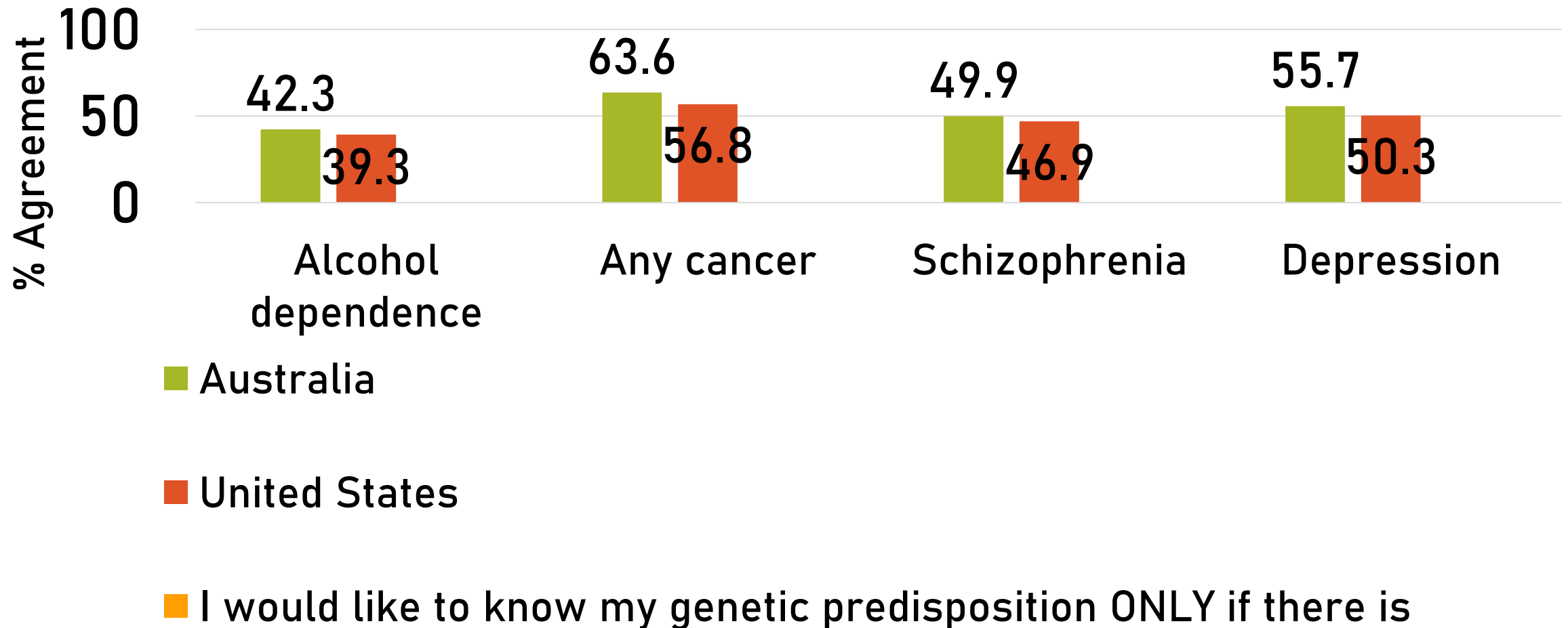


# Attitudes towards genetics (agree/disagree)

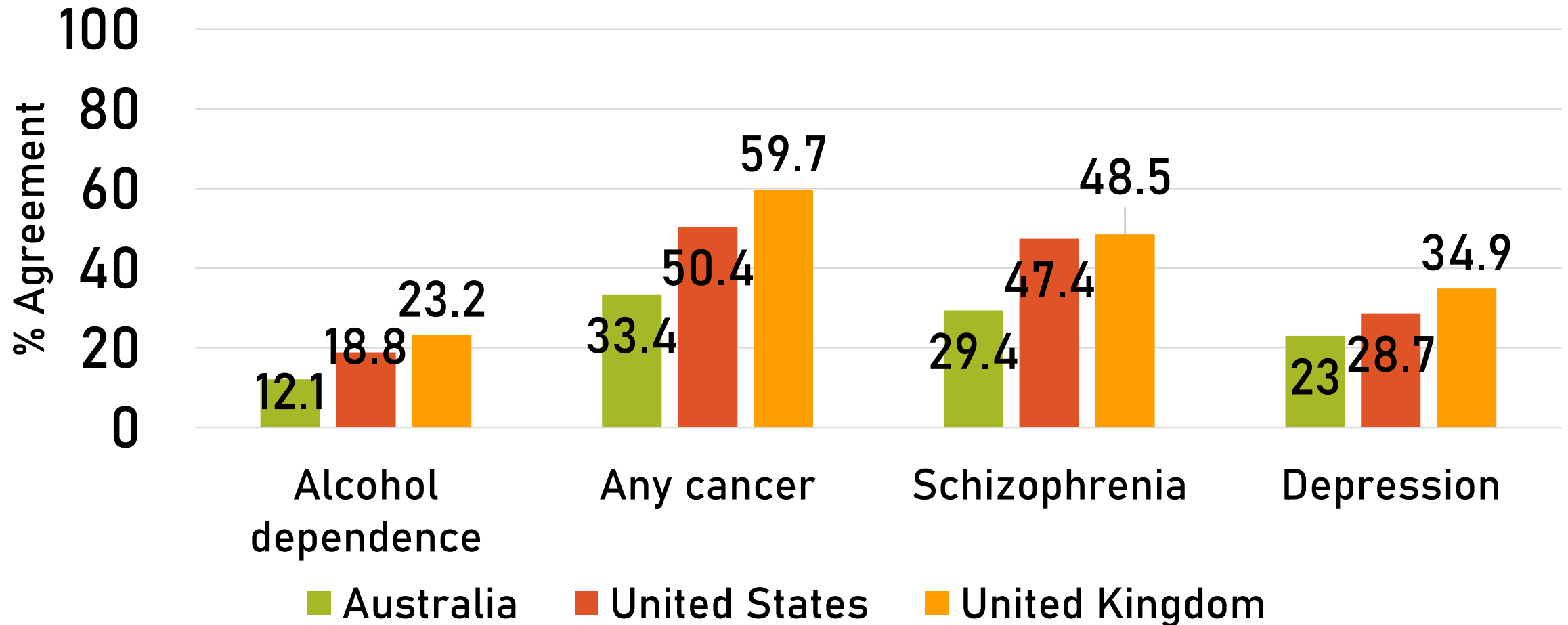
For **alcohol dependence, any cancer, schizophrenia, and depression**:

1. I would like to know my genetic predisposition ONLY if there is something I can do about it.
2. If I knew I had a strong genetic predisposition, I'm worried I wouldn't be able to cope with it.
3. I'm concerned I won't be able to get health/life insurance if I get a genetic test.
4. I wouldn't want to have children if I knew I had a strong genetic predisposition.
5. Knowing my children's genetic predisposition would help me be a better parent to them.
6. I wouldn't choose a partner who has a strong genetic predisposition.
7. Changes in my lifestyle could compensate my genetic predisposition.

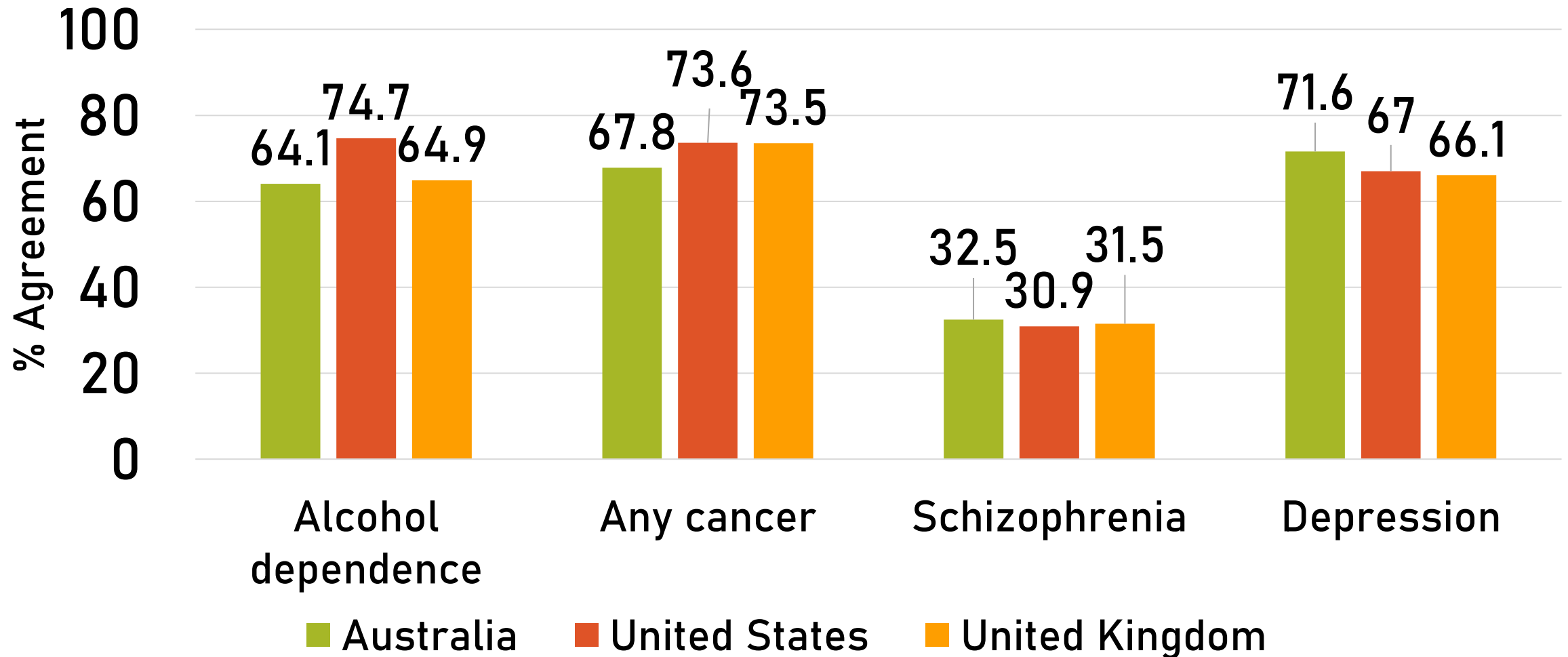
# I would like to know my genetic predisposition ONLY if there is something I can do about it



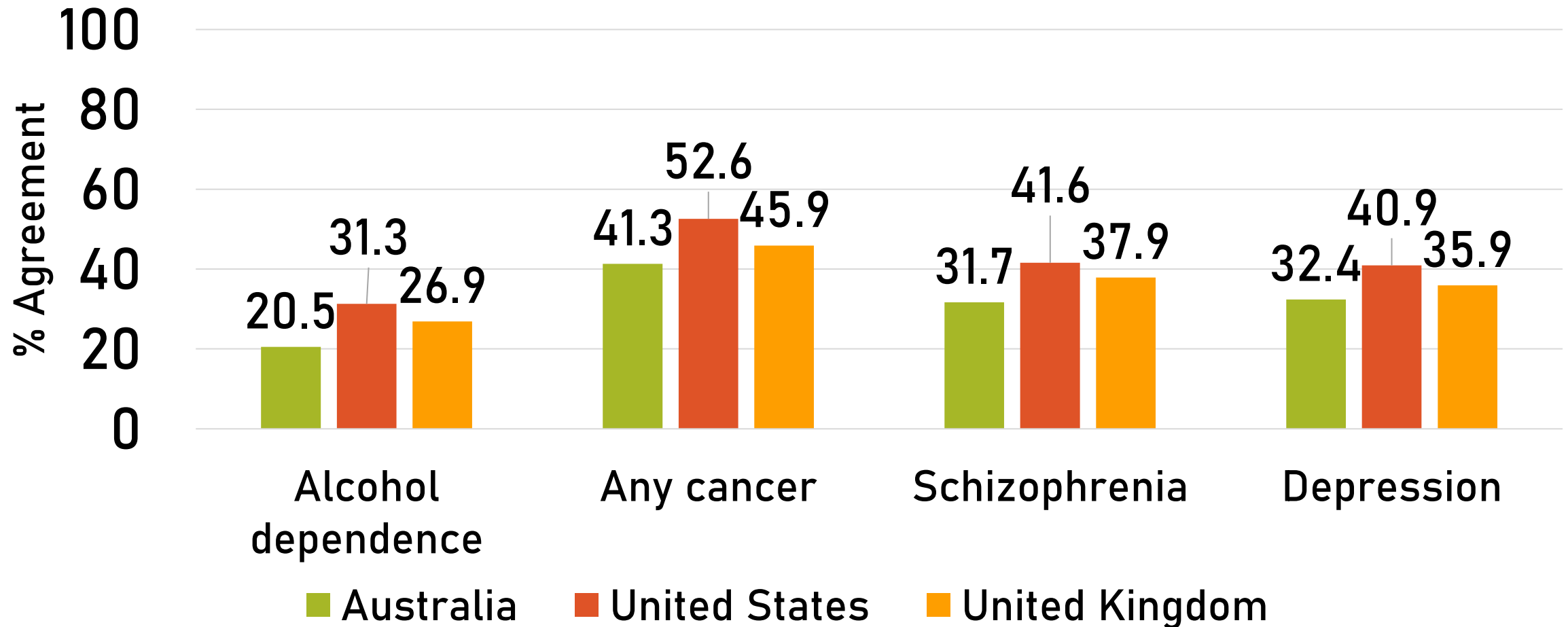
If I knew I had a strong genetic predisposition,  
I'm worried I wouldn't be able to cope with it



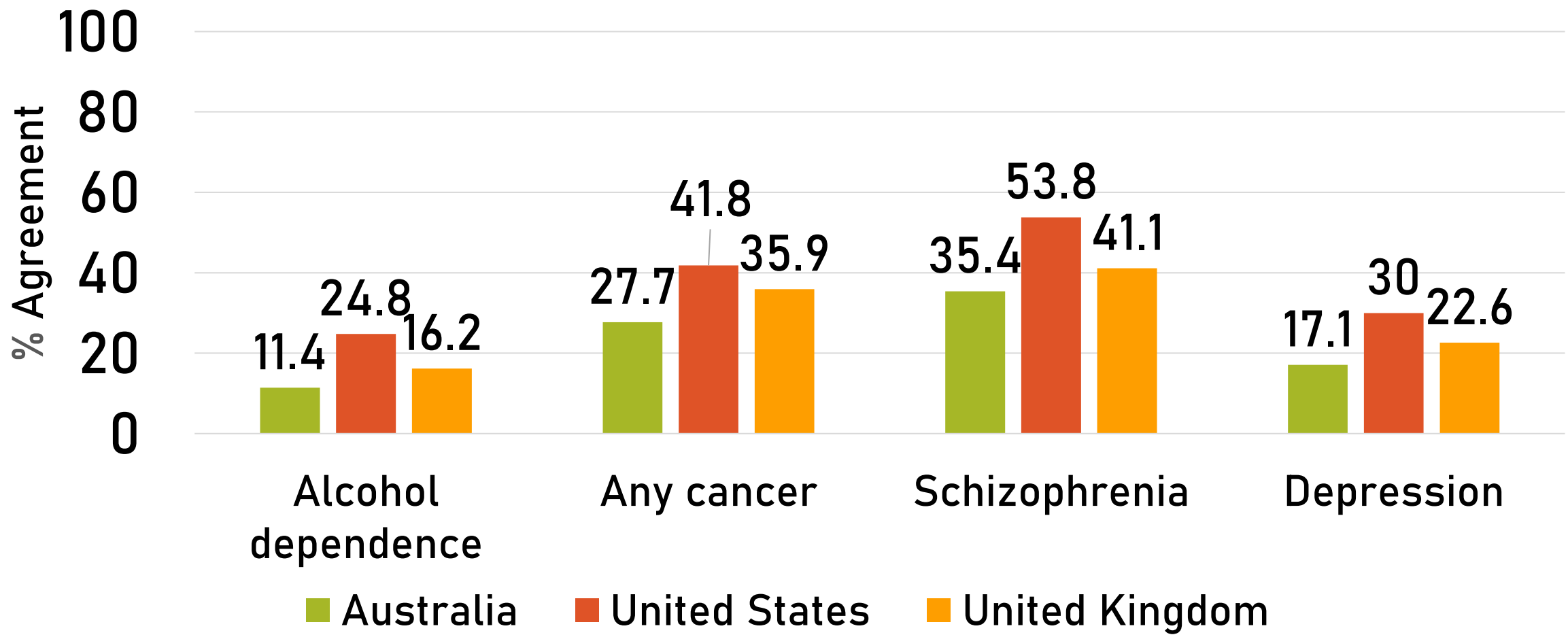
# Changes in my lifestyle could compensate my genetic predisposition.



# I'm concerned I won't be able to get health/life insurance if I get a genetic test



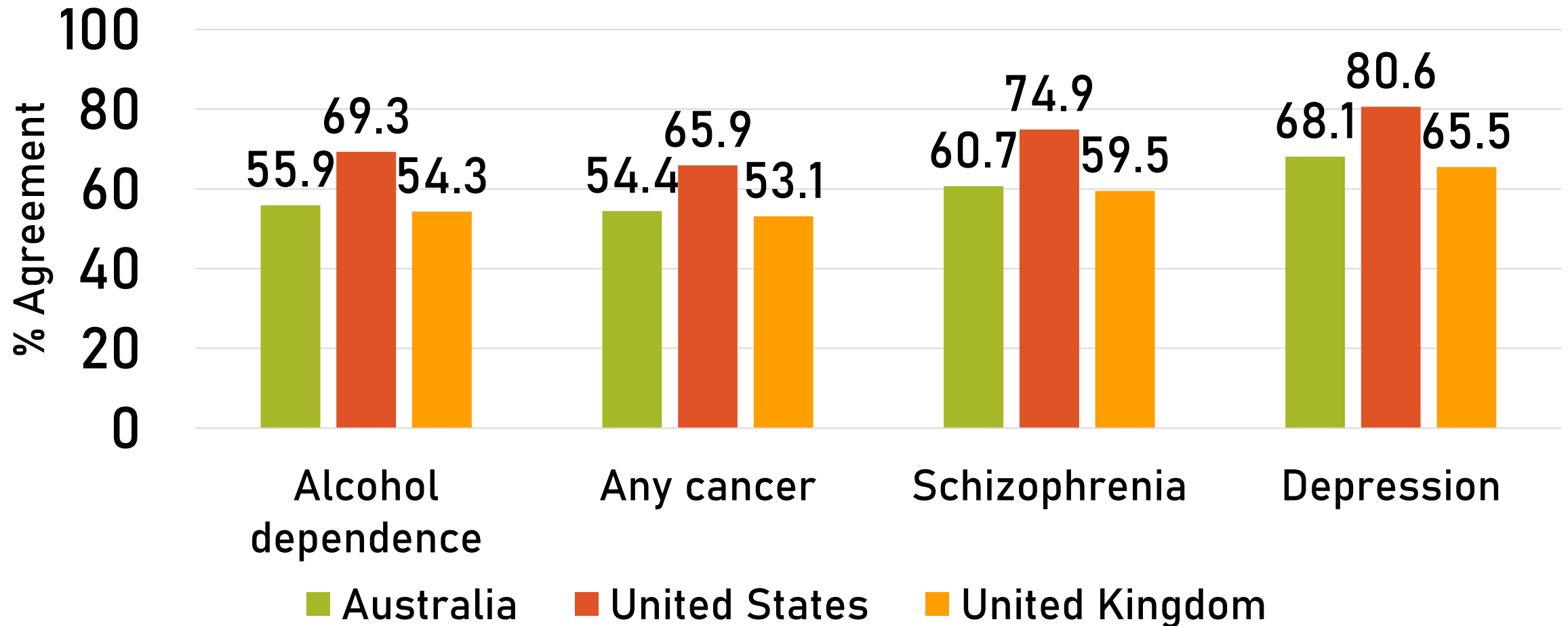
# I wouldn't want to have children if I knew I had a strong genetic predisposition



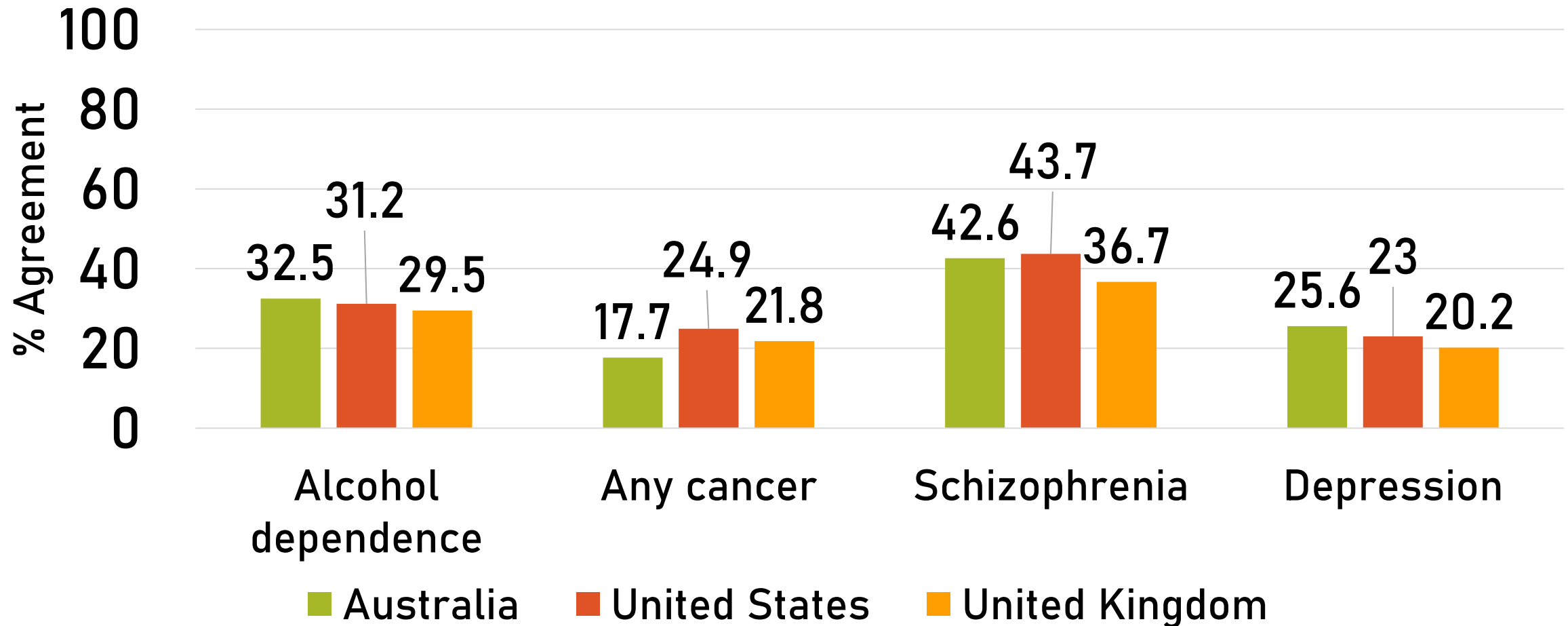


# Knowing my children's genetic predisposition would help me be a better parent to them

(usefulness)



# I wouldn't choose a partner who has a strong genetic predisposition (bias against)



# Broad look to the effect of literacy

- A 33-item TRUE/FALSE questionnaire based on the Public Understanding and Attitudes towards Genetics and Genomics questionnaire (PUGGS, Carver et al 2017).

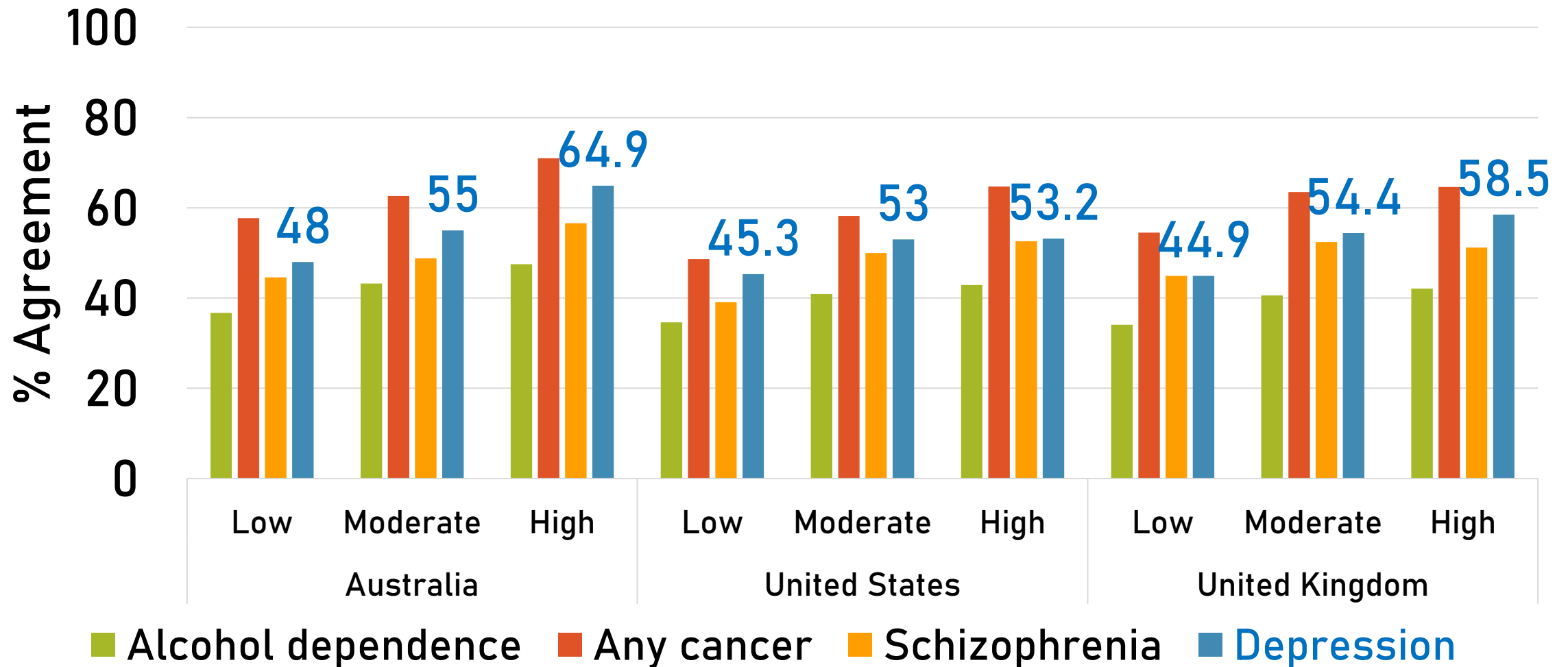
Genetic literacy was mostly **not** associated with attitudes (8 out of 72 cases).

Only effect found in Australian sample: higher literacy predicted less worry about coping.

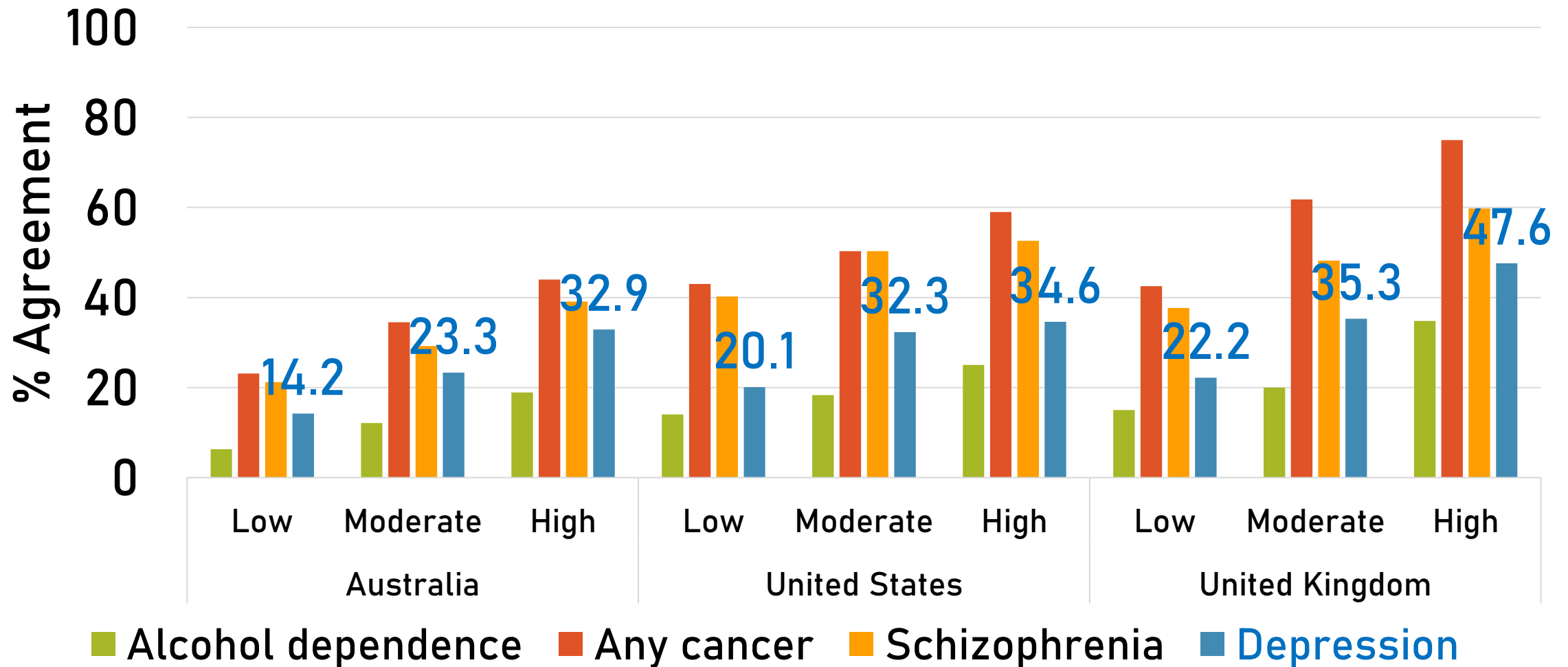
# Attitudes and need for answers

- *Need for closure* is the desire for “an answer on a given topic, any answer, . . . compared to confusion and ambiguity” (Webster & Kruglanski, 1994, p. 1049).
- In Australian and UK samples (but not US), need for closure was the most common predictor of responses (followed by beliefs about lifestyle-predisposition).

# I would like to know my genetic predisposition ONLY if there is something I can do about it



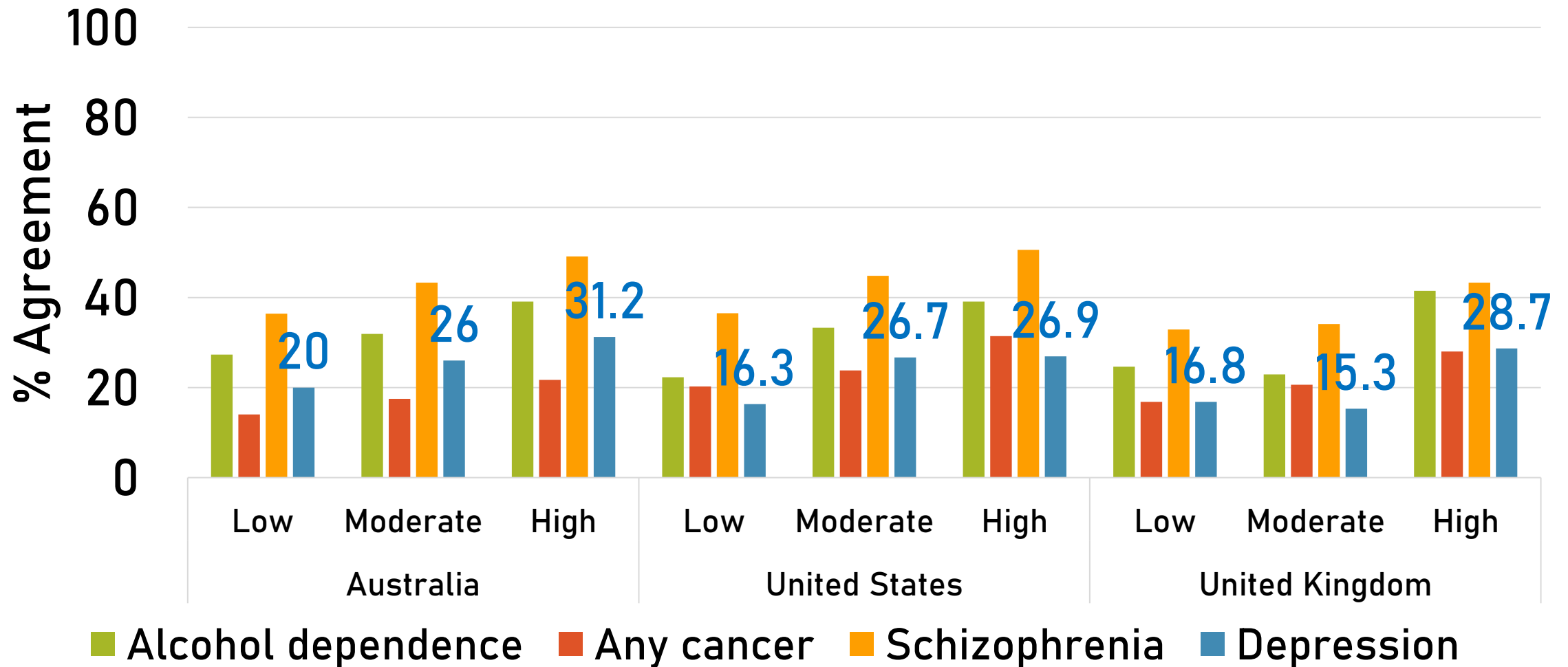
If I knew I had a strong genetic predisposition, I'm worried I wouldn't be able to cope with it



# Role of need for closure

- There is some work on need for closure in the context of genetic counseling (*Why Do Parents Want to Know their Child's Carrier Status? A Qualitative Study*, Vears et al 2015).
- Need for closure is better known in social psychology as the cognitive style underlying essentialism and prejudice (Roets & Van Hiel, 2015).

# I wouldn't choose a partner who has a strong genetic predisposition (bias against)





I wouldn't choose a partner who has a strong  
genetic predisposition (bias against)

Australia:  $\tau = 0.36$  to  $0.46$   
United States:  $\tau = 0.35$  to  $0.42$   
United Kingdom:  $\tau = 0.23$  to  $0.40$



Highest and only  
consistent correlation  
across attitudes, traits, and  
countries

Knowing my children's genetic predisposition  
would help me be a better parent to them (usefulness)

# Discussion

- Genetic literacy may not explain attitudes because of (still) insufficient literacy and/or because of our measure not being a specific measure of polygenic risk.
- Tolerance for uncertainty: promising gatekeeper to people's attitudes and response to genetics.
- On the other hand, responsibility to increase tolerance for uncertainty instead of capitalizing on it would likely decrease the negative psychological impact of such information.

# Thank you for listening

## Acknowledgments

### Supervisory team

Prof Sarah Medland

Prof Fiona Barlow

A/Prof Lucia Colodro-Conde

Psychiatric Genetics group at QIMR Berghofer

## Funding

John Templeton Foundation

Genetics and Human Agency project

