



Research report

Psychological distress may affect nutrition indicators in Australian adults [☆]



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ABSTRACT

Objective: The purpose of this research was to explore which demographic and health status variables moderated the relationship between psychological distress and three nutrition indicators: the consumption of fruits, vegetables and takeaway. **Method:** We analysed data from the 2009 Self-Reported Health Status Survey Report collected in the state of Queensland, Australia. Adults ($N = 6881$) reported several demographic and health status variables. Moderated logistic regression models were estimated separately for the three nutrition indicators, testing as moderators demographic (age, gender, educational attainment, household income, remoteness, and area-level socioeconomic status) and health status indicators (body mass index, high cholesterol, high blood pressure, and diabetes status). **Results:** Several significant interactions emerged between psychological distress, demographic (age, area-level socioeconomic status, and income level), and health status variables (body mass index, diabetes status) in predicting the nutrition indicators. Relationships between distress and the nutrition indicators were not significantly different by gender, remoteness, educational attainment, high cholesterol status, and high blood pressure status. **Conclusions:** The associations between psychological distress and several nutrition indicators differ amongst population subgroups. These findings suggest that in distressed adults, age, area-level socio-economic status, income level, body mass index, and diabetes status may serve as protective or risk factors through increasing or decreasing the likelihood of meeting nutritional guidelines. Public health interventions for improving dietary behaviours and nutrition may be more effective if they take into account the moderators identified in this study rather than using global interventions.

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Introduction

Increasing fruit and vegetable (FV) consumption appears to be important to reduce mortality arising from cardiovascular diseases and cancer (Scarborough, Nnoaham, Clarke, Capewell, & Rayner, 2010). FV consumption is also associated with modest weight reduction and the avoidance of weight gain (Conceição de Oliveira, Sichieri, & Sanchez Moura, 2003; Drapeau et al., 2004; He et al., 2004; Sartorelli, Franco, & Cardoso, 2008; te Velde, Twisk, & Brug, 2007; Vioque, Weinbrenner, Castello, Asensio, & de la Hera, 2008), and FV

consumption may be important in sustaining a low calorie density eating pattern (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). Conversely, studies suggest that takeaway food consumption is associated not only with higher intakes of energy, total fat, saturated fat, and sodium, but also increased body mass index (BMI) and weight gain across the lifespan (Bisset, Gauvin, Potvin, & Paradis, 2007; Schmidt et al., 2005; Taveras et al., 2005; Viner & Cole, 2006).

Given that the consumption of fruits, vegetables and takeaway all make important contributions towards diet quality, weight management and reducing the risk of chronic disease, it is important to understand which factors influence these nutrition indicators. Psychological distress is one such variable previously associated with lower fruit and vegetable intake (Kiviniemi, Orom, & Giovino, 2011; Konttinen, Mannisto, Sarlio-Lahteenkorva, Silventoinen, & Haukkala, 2010). Furthermore, psychological distress in terms of depressive symptoms, as measured by the Center for Epidemiological Studies Depression Scale, is positively associated with the consumption of

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takeaway and non-sweet energy dense foods (Bradshaw, 2011; Kontinen et al., 2010). Significant correlations have also been observed between psychological distress and fast food cravings (Lim, Norman, Clifton, & Noakes, 2009).

The relationship between distress and diet may be explained through several pathways. Emotions can control food choice, suppress food intake, impair cognitive eating controls, be regulated by food intake, and modulate eating in congruence with emotion features (see Macht, 2008). Sweet and high energy density foods may improve mood and reduce stress through brain opioidergic and dopaminergic neurotransmission (Gibson, 2006). It is plausible that, as distress increases, preferences for sweet and high energy density foods increase, while the desire for and consumption of foods lower in energy density (e.g., fruit and vegetables) decreases.

In the United States, 3.5% of adults aged 18 and over experienced psychological distress during the past 30 days in the first half of 2013 (Schiller, Ward, & Freeman, 2013). The 2012 Health Survey of England reported that 18% of women and 12% of men scored 4 or more on the General Health Questionnaire, indicating probably mental ill-health (Knott, 2013). In Australia in 2011–12, approximately one in ten Australian adults (10.8%, or 1.8 million people) reported experiencing high or very high levels of psychological distress (Australian Bureau of Statistics, 2012a). Given these high prevalence rates and the strong association between psychological distress and dietary behaviour, it is important to better understand the nature of these relationships on a population basis.

In addition to the association between distress and dietary behaviour, there are also direct unique associations between these aforementioned nutrition indicators and several demographic and health status variables. Demographic variables include age, gender, and educational attainment (Azagba & Sharaf, 2011); household income (Kamphuis et al., 2006) and remoteness and area-level socioeconomic status (Queensland Health, 2011, 2012), while health status variables include BMI (Atlantis, Barnes, & Ball, 2008; Zhang & Fu, 2011); cholesterol and diabetes status (Fang, Keenan, & Dai, 2011); and blood pressure status (Alonso et al., 2004).

While there is good evidence of the unique direct associations between these variables and dietary behaviour, less is known about the possible moderating effect of these variables between psychological distress and dietary behaviour. Of those variables which have been tested as moderators, Kiviniemi et al. (2011) observed that the relationship between psychological distress and FV consumption differed depending on race/ethnicity. While the inverse relationship between distress and FV consumption was observed in white and Hispanic respondents, it disappeared in African American respondents. Cohen et al. (2002) have also found an inverse relationship between distress and FV intake in women but not in men.

To the best of our knowledge though, no existing study has examined whether the relationships between psychological distress and nutrition indicators are moderated by the aforementioned demographic factors or health status variables, with the exception of gender (Cohen et al., 2002). Understanding these relationships will enable clinicians, public health researchers, and health promoters working with groups reporting psychological distress to target specific population subgroups dependent on their risk of poor nutrition. Based on these objectives, this study examined a range of possible demographic (age, gender, income, education, remoteness, and area-level socio-economic status) and health status variables (BMI, blood pressure status, cholesterol status, and diabetes) to explore moderating effects upon the relationships between psychological distress and consumption of fruits, vegetables or takeaway. Based on the demographic factors outlined above, it will be hypothesised that:

- (1) The inverse relationship between distress and FV consumption would be present for women but not for men, consistent

with the findings of Cohen et al. (2002). We further hypothesised that a positive relationship between distress and takeaway consumption would exist for males but not for females, since men have higher levels of takeaway consumption (e.g., Van der Horst, Brunner, & Siegrist, 2011).

- (2) a negative relationship between fruit consumption and distress and positive relationship between distress and takeaway consumption is more likely to exist in younger age groups than older age groups. This hypothesis is proposed on the basis that previous research finds higher fruit consumption amongst older age groups (e.g., Casagrande et al., 2007; Guenther et al., 2006; Johansson & Andersen, 1998; Kant et al., 2007; McClelland et al., 1998; O'Connor et al., 2010; Quadir & Akhtar-Danesh, 2010; Stewart et al., 2004; Wolf et al., 2008).
- (3) the inverse relationship between distress and FV consumption and positive relationships between distress and takeaway consumption will only exist for adults with lower levels of education. This is due to those with higher education levels having greater awareness of healthy levels of nutrition indicators (Powell, Zhao, & Wang, 2009). We hypothesise that an inverse relationship between distress and the nutrition indicators (fruit and vegetable) will only exist at lower income levels since adults from higher income brackets find fruits and vegetables more affordable (Drewnowski & Darmon, 2005; Drewnowski & Specter, 2004; French, 2003; Glanz, Basil, Maibach, Goldberg, & Snyder, 1998; Powell et al., 2009; Putnam & Allshouse, 1999). We hypothesise a positive relationship between distress and takeaway consumption for those with lower income levels, since takeaway is more commonly consumed at fast food outlets by individuals with lower incomes (e.g., Fleischhacker, Evenson, Rodriguez, & Ammerman, 2011; Thornton, Bentley, & Kavanagh, 2011; Thornton, Crawford, & Ball, 2010).
- (4) the inverse relationship between distress and FV consumption will remain for adults from rural and regional areas, but not for adults living in urban areas. This is hypothesised because we expect that fruit and vegetable consumption will be more accessible to those residing in major cities (Backman et al., 2011; Bodor et al., 2008; Leather, 1995; Morland, Wing, & Roux, 2002; Pearson et al., 2005; Zenk et al., 2005). We hypothesise a positive relationship between distress and takeaway consumption frequency only for adults living in major cities, also because of increased access to takeaway food (e.g., Thornton et al., 2011).
- (5) In terms of moderation, we hypothesised that an inverse relationship between distress and FV consumption and a positive relationship between distress and takeaway consumption will persist for adults from lower SES quintiles but not for adults from higher SES quintiles. This is based on research which highlights that adults from higher SES areas have higher levels of fruit and vegetable consumption, possibly because of the greater ability to afford these foods (Anderson et al., 1994; Casagrande et al., 2007; Dubowitz et al., 2008; Eisenberg et al., 2005; Guenther et al., 2006; Johansson & Andersen, 1998; Kamphuis et al., 2006; Kant et al., 2007; Lindström et al., 2001; Litt et al., 2011; McClelland et al., 1998; O'Connor et al., 2010; Quadir & Akhtar-Danesh, 2010; Sorensen et al., 2007; Stewart et al., 2004; Wolf et al., 2008).
- (6) Inverse relationships between distress and FV consumption and positive relationships between distress and takeaway consumption will be observed for adults without high blood pressure, diabetes, or high cholesterol, but not for those who do have these conditions. This hypothesis is based on previous findings that people with higher awareness of hypertension consume more fruits and vegetables (Dickson, Blackledge, & Hajjar, 2006).

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