

## Dietary Interventions for Children accessing Psychological Treatment

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DECLARATION

This report contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this report contains no materials previously published except where due reference is made.

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## Literature Review: Dietary Interventions for Children Presenting for Psychological Treatment

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### **Abstract**

Advances in understanding of the microbiome-gut-brain axis, as well as associations between nutritional deficits in some psychopathology and neurodevelopmental disorders has seen an emergence of novel dietary intervention for the treatment of these conditions. This review examines literature on the evidence for a link between the microbiome and psychological health, as well as dietary interventions for children with psychological and neurodevelopmental disorders. It examines treatment potentials, gaps in current knowledge and critically explores what is known about the use of these interventions for children within psychological treatment settings. It highlights the paucity of research in the area, potential risks associated with these interventions and the need to better understand the role psychologists are playing in the perpetuating the uptake of these interventions.

Microbiomic research has produced new understandings about the gut-brain relationship, and consequently, new hypotheses about the aetiological pathways for numerous disorders (Nowakowski et al. 2016). This has offered hope for new, potentially more effective treatments for these conditions (Nowakowski et al. 2016). Overarchingly, these new treatments are dietary interventions which seek to improve overall health through supplementation or elimination of specific dietary components, or by replacing a normal diet with dietary formulas (Kim, 2019).

Associations between diet and mental health has seen diet positioned as a modifiable risk factor for psychopathology (Marx, Mosely, Berk & Jacka, 2017). Inflammation, oxidative stress and neuroplasticity have been implicated in the relationship between diet and psychopathology (Marx et al. 2017). The microbiome has been positioned as the mediating pathway for these processes (Marx et al. 2017). Recently, research has explored whether imbalances of microbiota, referred to as dysbiosis, is implicated in the development of psychopathology (Dinan & Cryan, 2017). This research has seen pre-biotics and probiotics used to reduce anxiety-like behaviours in germ free mice (Ait-Belgnaoui et al. 2014; Gareau et al. 2011; Luczynski, 2016). The introduction of pathologic bacteria has conversely been

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used to increase these symptoms (Luczynski, 2016; Neufeld, Kang, Bienenstock & Foster, 2011).

Building on these findings, human studies have reported associations between the balance of microbiota in specific psychopathology and neurodevelopmental disorders, including, schizophrenia, depression, bipolar disorder and autism spectrum disorders. (De Angelis et al. 2013; Dickerson, Severence & Yolken, 2017; Fond et al. 2015; Kang et al. 2013; Nguyen, Kosciulek, Eyler, Knight & Jeste, 2018; Wang et al. 2011). These findings have resulted in increased consideration for the potential role probiotics and prebiotics may have in the treatment of various psychological and neurodevelopmental conditions (Mirsa & Mohanty, 2019).

Microbiomic research has also hypothesised that specific nutrients act on biological processes which are modulated by the microbiome, potentially influencing the development of mental illness (Marx, Mosely, Berk & Jacka, 2017). Further research has identified relationships between specific nutrient deficiencies and certain psychological and neurodevelopmental disorders (Anglin, Samaan, Walter & McDonald, 2013; Bender, Hagan & Kingston, 2017; Firth et al. 2017; Murri et al. 2013; Saghazadeh, Ahangari, Hendi, Saleh & Razaeei 2017; Wang, Zhai & Liu, 2016). These findings have seen an interest in whether dietary supplements may aid the amelioration of symptoms of psychopathology (Marx et al. 2017).

Interest in the association between the gut and mental health has been mirrored in the broader population. As a result, dietary interventions for various pathologies have been promoted throughout popular media (Camilleri, 2019; Quigley, 2016). Many of these diets lack scientific backing, and spruik aetiological explanations resembling knowledge emerging from microbiomic research (Camilleri, 2019; Quigley, 2016). Despite a lack of evidence, parents of children with psychological and neurodevelopmental disorders are commonly implementing these treatments (Zane, Davis & Rosswurm, 2008). This is problematic, as parents invest time, finances and emotional resources in ineffective treatments. Moreover, they distract parents from accessing evidence-based treatments, and may pose a risk to the health and social-emotional wellbeing of children using them (Sax, 2015; Tuzikow & Holburn, 2011, Zane et al. 2008).

This paper reviews the current literature on the evidence for a link between the microbiome

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and psychological health, as well as dietary interventions for children with psychological and neurodevelopmental disorders. It examines treatment potentials, gaps in current knowledge and critically examines what is known about the use of these interventions for children within psychological treatment settings.

### **Current evidence for Dietary Interventions for Common Psychological and Neurodevelopmental Disorders in Childhood**

A plethora of dietary interventions for psychological and neurodevelopmental disorders have received attention within the literature. Some have been hypothesized to offer benefits to individual conditions, whereas others, have been studied more broadly across a diversity of conditions. Table 1 provides a brief description of specific diets discussed in this review.

**Autism Spectrum Disorders (ASDs).** Various dietary interventions have received attention within scientific research examining treatments for ASDs. Within this research, food intolerances and allergies have been positioned as causal factors in the development of ASD symptoms (Kawicka & Regulaska-Ilow, 2013). Research demonstrating excessive levels of food specific immunoglobulins in some children with ASDs has supported this notion (Trajkovski et al., 2008). Consistent with this, elimination diets targeting offending foodstuffs have been considered as potential treatment avenues.

The gluten-free and/or casein free (GF/CF) diet is the most popular elimination diet for this cohort (Hall & Riccio, 2012). Despite its popularity, a review (Mulloy et al. 2010), failed to demonstrate its efficacy in reducing behavioural symptoms of ASDs. Another review reported more positive findings from a small number of studies, however noted methodological issues rendered the evidence unreliable (Marí-Bauset, Zazpe, Mari-Sanchis, Llopis-González & Morales-Suárez-Varela, 2014). Therefore, the use of this diet in the treatment of ASDs remains unsupported by current research.

The specific carbohydrate diet has also been popularised in the treatment of ASDs (Hall & Riccio, 2012). This diet purportedly reduces nutritional deficiencies associated with malabsorption by preventing the growth of pathological intestinal microflora (Kawicka & Regulaska-Ilow, 2013). The only published study evaluating the efficacy of this diet found was a case study, which reported complete amelioration of ASD symptoms in a child with ASD and chronic constipation following treatment with vitamin C, magnesium and the specific carbohydrate diet. However, underlying gastrointestinal issues were implicated in the

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emergence of this child's ASD symptoms (O'Hara & Szakacs, 2008). Thus, like the GFCF, the specific carbohydrate diet lacks empirical support as a treatment modality.

A review undertaken by Castro et al. (2015) offers some limited support for the ketogenic diet in reducing behavioural symptoms associated with ASDs. These findings were limited as the review drew from a small number of heterogeneous studies, all with methodological limitations. Potential mechanisms through which this diet could positively benefit ASD symptoms have been proposed (Bostock, Kirkby & Taylor, 2017), however, have failed to yield a convincing argument for the use of this diet, particularly given concerns regarding the tolerability of the ketogenic diet have been noted (Castro et al.).

Recent interest in the microbiome has also offered treatment potentials, including theorising possible benefits from probiotic and prebiotic supplementation. No evidence was found supporting the use of prebiotics in isolation to improve behaviours in ASD. Review undertaken by Ng et al. (2019) identified one small study which reported improvement in anti-sociality scores in children with ASD when probiotics were coupled with a GFCF diet. Two randomized, placebo-controlled trials failed to demonstrate an effect in the reduction of behavioural symptoms in ASD when treated with probiotics in isolation (Ng et al. 2019). Invariably, research in this area is limited and therefore unable to offer support for the use of probiotics in the treatment of ASDs.

Vitamin deficiencies are common amongst children with ASDs (Kawicka & Regulska-Ilow, 2013; Saghadzadeh et al. 2017; Wang, Zhai & Liu, 2016), resulting in some attention to the potential role that vitamin supplementation may play in reducing ASD symptoms.

Low vitamin-D levels in early life have been associated with ASD diagnoses, leading to the view that it may be implicated in the pathogenesis of the disorder (Mazahery et al. 2016). Research into the impact of vitamin-D supplementation on ASD symptoms in individuals with ASD is limited. Jia et al. (2015) report on single case in which core ASD symptoms improved following vitamin D<sub>3</sub> supplementation. Feng et al. (2017) reported improvement in ASD symptoms following supplementation with vitamin-D<sub>3</sub> in a larger, open label trial. One randomised placebo-controlled trial was undertaken by Saad et al. (2018) however, this study has since been retracted due to reliability issues (Saad et al. 2018). Further randomised, placebo-controlled trials are required to reliably assess the potential role of vitamin-D



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supplementation in the treatment of ASDs.

B-vitamins have also received some attention within the literature. Trials examining combination treatment of vitamin-B<sub>6</sub> and magnesium have failed to produce convincing evidence (Murza, Pavelko, Malani & Nye, 2010; Nye & Bryce, 2002). A small number of studies have focussed on B<sub>12</sub> with or without folic acid, producing mixed results. James et al. (2009) reported improvements in adaptive functioning following treatment with a combination of methylcobalamin and folinic acid in an open-label trial. A small randomised, placebo-controlled trial also produced promising findings, reporting significant improvements in behavioural symptoms associated with ASD (Bertoglio et al. 2010). Similar findings were found by another randomised, placebo-controlled trial assessed the efficacy of methyl-B<sub>12</sub> supplementation on ASD symptoms, reporting improvements on clinician report scales, however no effect was found on parent-rated scales (Hendren et al. 2016). Invariably, these studies are small, and offer conflicting findings, thus calling for further research.

Few studies have explored the use of omega-3 fatty acids on various impairments in children with ASDs (Bent, Bertoglio & Hendren, 2009). Whilst studies have demonstrated improvements, data has predominantly emerged from uncontrolled trials, and therefore efficacy cannot yet be reliably established (Bent, Bertoglio & Hendren, 2009).

Evidently, despite the diversity of dietary interventions which have been considered in the treatment of ASDs, there remains no quality evidence supporting these interventions. Whilst some approaches, such as GFCF diets have demonstrated an effect in some studies, research has been unable to reliably demonstrate an effect above that of placebo. Current research is limited by a paucity of data, heterogeneous study designs and methodological limitations. Thus, further research is required.

**Attention Deficit/Hyperactivity Disorder (ADHD).** Like ASDs, research indicates that dietary interventions are widely used in the treatment of children with Attention Deficit Hyperactivity Disorder (Sinha & Efron, 2005).

Like ASDs, nutrient deficiencies are commonly reported in children in ADHD (Kiddie, Weiss, Kitts, Levy-Milne & Wasdell, 2010; Sinn, 2008). Studies have examined the efficacy of zinc, iron, magnesium and mega dose multi-vitamins in the treatment of ADHD. To date,

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these studies have consistently failed to demonstrate the effectiveness of supplementation in reducing ADHD symptoms (Ghanizadeh & Berk, 2013; Heilskov Rytter et al. 2015; Hariri & Azadbakht, 2015).

Lower levels of blood essential fatty acids (EFAs) have been reported in children with ADHD (Raz & Gabis, 2009). This finding has led to research in the use of EFAs as a treatment modality for the condition. Whilst open-label trials assessing the potential utility of EFA supplementation in children with ADHD have demonstrated an effect, meta-analysis of randomised control trials produced a small effect size (Bloch & Qawasmi, 2011). Given the efficacy of pharmacological and behavioural interventions for ADHD, the use of EFAs may be beneficial in augmenting current treatments, particularly for children with low blood levels of EFAs, however EFA supplements are not considered an effective treatment alternative (Bloch & Qawasmi, 2011; Gillies, Sinn, Lad, Leach & Ross, 2012; Raz & Gabis, 2009).

Elimination diets for ADHD were popularised by Feingold in the 1970s (Smith, 2011; Williams & Cram, 1978). These diets involve the removal of purported antigenic foodstuffs, including artificial colours, preservatives, flavours and artificial sweeteners. There are various versions of these diets including the Feingold diet, Oligoantigenic, and “few foods” diets. The evidence to support these interventions is unconvincing (Heilskov-Rytter et al. 2014; Kavale & Forness, 1983; Millichap & Yee, 2012). Further reviews have argued that the lack of convincing findings may reflect heterogeneous study designs, calling for more rigorous research (Schab & Trinh, 2004). More recently, it has been suggested that elimination diets may be efficacious in identifying individuals experiencing ADHD symptoms induced by food (Pelsser et al. 2011). However, in the absence of further research, there remains insufficient evidence to support the efficacy of these approaches in the treatment of ADHD at the current time.

Overall, research in this area has consistently failed to yield convincing results. Whilst some have purported that elimination diets may be effective in certain subgroups; this area requires further exploration.

**Anxiety Disorders.** The use of dietary interventions for the treatment of anxiety disorders and symptoms has received limited attention within the literature. Studies which have been undertaken have predominantly explored the use of vitamin and mineral

supplementation.

Several studies have evaluated the efficacy of magnesium in the management of anxiety symptoms in adults. A review, (Boyle, Lawton & Dye, 2017) suggested that magnesium may reduce anxiety symptoms in vulnerable populations. Some evidence supports specific benefit in clinical populations, when coupled with other vitamins, minerals and herbal extracts (Lakhan & Vierira, 2010). Whilst these findings are promising, conclusions have been drawn from a limited number of heterogeneous studies, using varying doses and sample characteristics. Moreover, many studies have failed to demonstrate a significant effect above that of placebo (Boyle, Lawton & Dye, 2017; Lakhan & Vieira, 2010). These limitations call for caution when considering magnesium as an effective treatment for anxiety disorders.

Meta-analysis undertaken by Su et al. (2018) has reported potential benefit of omega-3 supplementation in the treatment of anxiety in those with and without a clinical diagnosis of an anxiety disorder. Subgroup analysis has identified that this benefit is more pronounced amongst those with a clinical diagnosis (Su et al. 2018). Whilst there is an absence of studies examining this effect in children, two case reports have indicated that omega-3 fatty acids may be beneficial in the management of anxiety symptoms in children with Bipolar Disorder and ASD (Bent, 2009; Vesco et al. 2015). Invariably, these findings appear promising, however replication of these findings, particularly within child populations is required before omega-3 supplementation can be adopted as an intervention for children presenting with anxiety disorders.

Several studies have established a relationship between probiotic use and a reduction in anxiety and stress symptoms in germ-free mice (Pirbaglou et al. 2016). These findings have been replicated in a small number of randomized control trials, which have established an effect above that of placebo in human subjects (McKean, Naug, Nikbakht, Amiet & Colson, 2017; Pirbaglou et al. 2016). Like omega-3 supplementation, whilst there is some evidence supporting the effect of probiotics in reducing anxiety symptoms, replication of these studies is required to establish a robust evidence base prior to the widespread adoption of probiotic supplementation as a treatment for anxiety disorders in children. Specifically, research evaluating efficacy within paediatric populations, as well as delineating efficacy amongst individual anxiety disorders is required.

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One study has reported zinc supplementation to reduce anxiety symptoms in children, however this result was comparable to those seen in children receiving placebo intervention (DiGiromalmo et al. 2010). As such, zinc supplementation is not supported as an intervention for children presenting with anxiety disorders.

Overall, research has suggested that both probiotics and omega-3 may be beneficial in the treatment of anxiety and anxiety disorders, however, data is limited. Further research is required to further assess their efficacy. Research examining other forms of supplementation, including zinc and magnesium is less promising, producing inconsistent findings and often failing to demonstrate an effect above placebo. As such, there is currently insufficient evidence to support the use of dietary interventions in the treatment for anxiety disorders.

**Major Depressive Disorder.** Like anxiety disorders, research into dietary interventions for Major Depressive Disorder has primarily focussed on dietary supplementation.

Meta-analysis' and systematic reviews have suggested omega-3 fatty acids, particularly eicosapentaenoic acid (EPAs) are effective in the treatment of depressive disorders in adults (Appleton et al. 2010; Grosso et al. 2013; Martins et al. 2009; Sublette et al. 2011; Martins, Bensten & Puri, 2012). Bloch and Hannestad (2012) failed to demonstrate the same effect, attributing the divergence in findings to publication biases. This attribution has been challenged, suggesting that methodological issues in the collection and analysis of data may account for these divergences (Martins, Bensten & Puri, 2012). Studies of the efficacy of omega-3 fatty acids in the treatment of depressive symptoms in children are limited. Two small, randomised, placebo-controlled double-blind trials have found administration of omega-3 fatty acids to be effective in yielding significant reduction in depressive symptoms in children diagnosed with Major Depressive Disorder (Nemets, Nemes, Bienenstock & Foster, 2006; Osher & Belmaker, 2009). Overall, current findings suggest that omega-3 supplementation may be effective in the treatment of depressive symptoms. However, further research, particularly within paediatric samples is required to adequately demonstrate efficacy and safety within this cohort.

Studies have inconsistently reported an association between folate and vitamin-B<sub>12</sub>

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deficiency in adults with depressive symptoms (Bender et al. 2017; Gilbody, Lightfoot & Sheldon, 2007; Petridou et al. 2016). Whilst this association has been identified, randomized placebo-controlled trials examining the utility of vitamin-B<sub>12</sub> and/or folate supplementation have to date failed to establish a significant effect on depressive symptomology (Almeida, Ford and Flicker, 2015). Review of the literature was unable to identify any studies examining the efficacy of folate and/or B-vitamin supplementation in children, and therefore there is no evidence to support the use of vitamin-B supplementation in children presenting with depressive symptoms.

Some preliminary studies have suggested that vitamin-C may have antidepressant effects in adults (Zhang et al. 2011; Wang et al. 2013). One pilot intervention study was identified, using a randomized, double-blind placebo-control design to examine the efficacy of vitamin C as an adjunctive treatment to pharmacological intervention using fluoxetine. This study found vitamin-C supplementation significantly reduced depressive symptoms above that of placebo (Amr et al. 2013). Whilst these findings are promising, the sample size was small, and replication is required to add support to these findings.

Studies within adult samples have established a relationship between vitamin-D deficiency and depressive symptoms (Anglin et al. 2013; Ju, Lee & Jeong, 2013). Studies into the use of vitamin-D in the treatment of depressive symptoms have yielded inconsistent results (Gowda, 2015; Li et al. 2014; Shaffer et al. 2014; Spedding, 2014). Spedding (2014) attributed the divergence in findings to “biological flaws” within the research design. Vitamin-D has been identified as a potential causal factor in the emergence of depressive symptoms. Consistently, Spedding (2014) undertook a meta-analysis of studies examining the efficacy of vitamin-D supplementation in depression, only including participants with vitamin-D deficiency. Within this subgroup, vitamin D supplementation yielded benefits comparable to that of antidepressant medications (Spedding, 2014). More recent findings also suggest vitamin-D supplementation may be beneficial for a subgroup of individuals with depressive disorders and underlying vitamin D deficiency (Parker, Brotchie & Graham, 2017). These findings have been supported by a small study using an adolescent sample, which found vitamin-D supplementation beneficial in the amelioration of depressive symptoms in a sample with vitamin-D deficiency (Högberg et al. 2012). Thus, whilst research is modest, there is increasing evidence to suggest that vitamin-D supplementation may be beneficial in the treatment of depressive symptoms amongst those with vitamin-D deficiency.

Zinc has also been implicated in the development of depressive disorders in adults (Swardfager et al. 2013). One study has examined the use of zinc supplementation for the treatment of depressive symptoms in Guatemalan children, however this study failed to find any effect. Potentially, zinc may only benefit in cases where zinc deficiency is present at baseline, however research is limited (DiGirolamo et al. 2010).

Theories implicating the microbiome in the development of psychopathology have seen an emerging interest in the role of probiotics in the treatment of depressive symptoms. Whilst no studies were identified within paediatric populations, two meta-analysis found probiotics to be effective in reducing depressive symptoms in non-clinical adult samples (Huang, Wang & Hu, 2016; Wallace & Milev, 2017). Meta-analysis undertaken by Ng et al. (2018) failed to find benefit more above that of placebo in the general sample, however subgroup analysis revealed significant improvements in those experiencing mild to moderate depressive symptoms. These findings are promising, however require replication to build empirical support. Moreover, replication within paediatric samples is required.

Support for the use of specific dietary supplements in the treatment of depressive symptoms has yielded variable results. Whilst some supplements lack empirical support, others have a more promising evidence base. Current research suggests that some specific dietary supplements may be useful for specific subpopulations presenting with depressive symptoms. However, these studies are limited by inconsistent findings, small sample sizes and a lack of research in child populations. Consequently, the use of these supplements in the treatment of depressive symptoms would be pre-emptive and further research is required.

**Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems.** Research into the use and efficacy of dietary interventions for oppositional defiant disorder, conduct disorder and other behavioural problems is limited to a handful of studies.

These studies have suggested that omega-3 may be effective in reducing callous unemotional traits in adolescent boys (Gow et al. 2013) and may reduce oppositional behaviours in children with ADHD (Cooper et al. 2016). A randomized, double-blind placebo-controlled trial found that supplementation with a combination of vitamins, minerals and fatty acids was associated with a reduction in antisocial and violent behaviour amongst young adult prisoners

(Gesch, Hammond, Hampson, Eves & Crowder, 2002).

Evidently, research in this area is scant, and therefore not supportive of the use of dietary interventions for this cohort at the current time.

**Psychotic Disorders.** Although diagnosable psychotic disorders in children are rare, psychotic symptoms are more commonly reported (Stevens, Prince, Prager & Stern 2014).

A small number of randomised controlled-trials have explored whether omega-3 is beneficial in reducing the rate of conversion to psychosis amongst children and young people, yielding inconsistent findings (Amminger, 2013; McGorry et al. 2017). Limited studies have also examined the utility of omega-3 in first episode psychosis, also producing inconsistent results (Berger et al 2007; Berger et al 2008; Pawelczyk, 2016). As such, the role of omega-3 in the management of children and young people presenting with symptoms of psychosis remains unclear.

The role of gluten free diets in treatment of psychotic symptoms has briefly appeared in the literature. Lionetti et al. (2015) describe a case of a 14-year-old patient presenting with psychotic symptoms for whom elimination of gluten from the diet resulted in amelioration of symptoms. Morant (2011) implicates gluten in the emergence of psychotic symptoms in a 16-year old with downs syndrome and silent coeliac disease, however concludes that no specific causal relationship can be established.

Studies have demonstrated associations between vitamin-D deficiencies and reduced serum folate levels and a diagnosis of schizophrenia (Firth et al. 2017; Murri et al. 2013; Valipour, Saneei & Esmailzadeh, 2014; Wang et al. 2016). Whilst these findings suggest a relationship between nutrition and schizophreniform disorders, the application of these findings within the clinical setting to inform treatment would be premature.

Evidently, there is a sparsity of research in the use of dietary interventions in the treatment of psychotic symptoms. Moreover, where interventions have received greater attention, results have been inconsistent and therefore lack the empirical support to warrant their use within the clinical setting.

**Risks Associated with Dietary Interventions**

Evidently, there is an overabundance of potential dietary interventions for psychological and neurodevelopmental disorders commonly seen in childhood. Whilst the level of evidence is variable, research consistently fails to provide robust scientific support for dietary interventions in this area. The use of non-evidence-based interventions are an ineffective use of time, finances and other resources (Burnett, Livingstone, Woods & McNaughton, 2017; Christon, Mackintosh & Myers, 2010; Stevens & Rashid, 2008; Worosz & Wilson, 2012). Moreover, they distract parents from accessing evidence-based interventions for their children (Akins et al. 2014; Christon, Mackintosh & Myers, 2010; Tuzikow & Holburn, 2011). Unnecessary dietary modifications have been associated with adverse physical health consequences including nutritional deficiencies metabolic syndromes, insulin resistance, growth retardation, and liver abnormalities (Arslan et al. 2016; Kabbani et al 2012; Kirby & Danner, 2009; Reilly et al 2011; Tortora et al 2015; Ukkola et al 2012; Zupec-Kania & Spellman, 2008).

Psychosocial consequences have also been identified, with dietary modification being associated with social isolation, stigma and stress in children (Jordan et al. 2013). Reduced quality of life, depressive and anxiety symptoms have been associated with difficulty adhering to modified diets in adult populations (Deepak et al. 2018; Jordan et al. 2013). As such, the unnecessary uptake of dietary interventions is highly problematic.

**Parent use of Dietary Interventions for children with Psychological and Neurodevelopmental Disorders**

Despite vast gaps in knowledge and identifiable risks associated with dietary interventions, children are readily being placed on dietary interventions to aid the amelioration of symptoms associated with psychological and neurodevelopmental disorders. Over 50% of children with Autism Spectrum Disorders received some type of dietary intervention within their lifetime (Senel, 2010; Windburn et al. 2014; Wong & Smith, 2006). Similar findings have been reported for children with ADHD (Sinha & Efron, 2005). The wide diversity of treatments available, as well as many parents being unable to rigorously evaluate the current evidence base for each of these approaches is thought to perpetuate the uptake of these interventions (Zane, Davis & Rosswurm, 2008). These factors see parents seek information from less reliable sources, such as friends, family, non-scientific texts, and online sources (Carlson et al.



2013; Carlon et al. 2015; Miller et al. 2012).

In addition to these sources, health care professionals, including physicians, occupational therapists, chiropractors and pharmacists have been found to provide recommendations for an array of complementary and alternative interventions, including dietary interventions. (Miller, Schreck, Mulick & Butter, 2012; Wong & Smith, 2006). This is concerning and highlights the need for health care professionals to be educated on the evidence base and potential risks associated with these interventions.

### **Psychologist Attitudes and Use of Dietary Interventions in Clinical Practice**

Given the high prevalence of use of dietary intervention use among families with children presenting with psychological and neurodevelopmental disorders ascertaining psychologist knowledge, attitudes and practices associated with dietary interventions is necessary to ensure the profession is adhering to their ethical responsibility to provide treatments and advice which are consistent with the current evidence base. Moreover, understanding of psychologist attitudes and practices may be helpful in understanding the role that psychologists are playing in either promoting or discouraging the uptake of non-evidence based dietary interventions.

In the absence of research specifically exploring psychologist's attitudes and practices associated with the dietary interventions in clinical practice, research examining focussing on Complementary and Alternative Medicine may offer a point of comparison. Complementary and Alternative Medicine (CAM) is defined as,

*“A group of diverse medical and health care systems, practices and products that are not considered part of conventional medicine” (Barnes, et al. 2004, p. 54)*

Dietary supplements are considered one of the most frequently utilized CAM modalities (Barnes et al. 2008). Limited research has examined psychologist and psychology student's attitudes towards CAMs. This research has also sought to identify factors which may influence the intention to integrate CAMs into practice (Bassman & Uellendahl, 2003; Ditte et al 2011; Hamilton & Marietti, 2017; Wilson & White, 2007; Wilson, White & Obst, 2011). Overall, both psychologists and psychologist students have been found to hold positive attitudes towards CAMs (Bassman & Uellendahl, 2003; Ditte et al 2011; Hamilton & Marietti, 2017; Wilson & White, 2007; Wilson, White & Obst, 2011). Within this research, beliefs that integration of these approaches may offer choice, promote client autonomy and

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may allow for a more holistic or targeted treatment approach have been identified (Hamilton & Marietti 2017; Wilson, White & Obst, 2011).

Despite positive attitudes towards these approaches, psychologists and psychology students have been found to be wary of CAM integration. Predominantly, concerns about the lack of empirical support for these approaches have been voiced (Hamilton & Marietti, 2017; Wilson, White & Hamilton, 2013; Wilson & White, 2011; Wilson & White, 2008). These concerns have been associated with ethical dilemmas, that these treatments may not only be ineffective, but may pose risks to clients (Hamilton & Marietti, 2017). Less commonly, ethical concerns associated with dual roles and certain approaches involving physical contact have also been identified (Wilson & White, 2011).

The prevalence of CAM integration amongst psychologists has received limited attention within the literature. Two small, qualitative studies undertaken with Australian Psychologists, reported admission by a minority of participants that they had incorporated CAMs into their practice (Hamilton & Marietti, 2017; Wilson & White, 2011). These studies involved face-to-face interviews with a researcher, therefore, social desirability bias' may have resulted in an underreporting of actual integration practices within these studies. One further study, involving an anonymous survey to examine beliefs underlying psychologist's willingness to integrate CAMs, suggested this was occurring more frequently. Within this sample, of 119 participants, 31.1% were identified as having high intention to recommend some form of CAM within their practice. A further 61% of participants indicated a willingness to recommend CAMs within their practice. These findings suggest that, despite concerns psychologists may commonly be integrating CAMs into their clinical practice.

Invariably, CAMs are heterogeneous by way of theoretical orientation, training, licencing and regulatory requirements. They also have highly variable levels of empirical support. Accordingly, the extent to which these findings can be interpreted with reference to a single CAM approach, such as dietary interventions may be somewhat limited. Nevertheless, acknowledging these limitations, these findings would indicate that the practices of psychologists may be contributing to the frequent uptake of non-evidence based dietary interventions amongst children with psychological and neurodevelopmental disorders.

### **Discussion**

Review of the literature demonstrates that a diversity of dietary interventions have been

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hypothesised to offer benefits in the treatment of specific psychological and neurodevelopmental disorders in children. Whilst some interventions have been studied and failed to demonstrate any benefit, others offer promise, however their evidence-base is limited by a lack of rigorous evaluation.

Nutritional supplementation was common across the disorders, however, whole of diet approaches were only reported for ASDs and ADHD. Seemingly, nutritional supplementations offer clearer mechanistic rationales than whole of diet approaches. Children with ASDs and ADHD commonly experience executive dysfunction, and difficulties arising from this have been associated with low frustration tolerance and increased challenging behaviours (Goldin, Matson, Tureck, Cervantes & Jang, 2013). These behaviours may lead to greater desperation to find a cure, rendering parents, and clinicians more susceptible to non-evidence-based interventions, where mechanistic pathways are less clear (Best, 2010; Paris, 2013).

The absence of ODD, CD and other behavioural disorders in the literature was also noteworthy. There are various potential explanations for this. There is an incredibly high prevalence of co-morbidity within this cohort, with 92.4% of children diagnosed with ODD also having a co-morbid DSM-IV diagnosis (Nock, Kazdin, Hiripi & Kessler, 2007). Trials focussing purely on a unitary condition may be difficult to undertake. Moreover, there is potentially no clear rationale as to why these conditions would be less receptive to dietary intervention than other conditions with overlapping symptoms such as ADHD, which do appear in the literature.

Whilst research was limited, there was some evidence to suggest that some psychologist's may be perpetuating the uptake of these interventions. This illuminates several potential ethical concerns.

Evidently, despite increasing interest in the association between diet and psychological health within scientific community and the broader population, evidence supporting the use of dietary interventions for children presenting with neurodevelopmental and psychological disorders is lacking. Clinicians have a responsibility to support clients to access treatment which is effective, and to inform them of risks associated with interventions they undertake. Achieving this requires commitment to evidence-based practice. Given the limitations of

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current research into dietary interventions in this arena, their integration into psychological practice represents a deviation from this mandate, warranting attention in future research.

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Table 1

*Brief description of diets referenced in the current article.*

Dietary Intervention	
The Feingold Diet	An elimination diet which targets the removal of salicylates and artificial food colourants with aim of reducing hyperactivity. (Heilskov-Rytter et al. 2014)
The Few Foods Diet	A highly restricted diet, in all but a “few foods” are eliminated for a selected duration. Typically, foods allowable on this diet include two types of meat, two types of carbohydrates, two vegetables, two fruits, oil and water. After an elimination period, individuals who have shown improvement on this diet have their diet gradually increased to identify foods which may be triggering a reaction. (Heilskov-Rytter, et al. 2014)
The Gluten Free/Casein Free (GFCF) Diet	A diet which involves the removal of gluten, the main protein found in wheat, rye and barley as well as casein, the main protein found in dairy products. (Elder, 2008)
The Ketogenic Diet	Involves entering into an initial fast to induce ketosis. This is followed by the introduction of a diet which is high in fat, contains adequate protein to maintain growth and limits carbohydrates (Wheless, 1995).
Low-GI	Low-GI diets restrict the intake of foods with a high glycaemic index, including certain vegetables, the majority of fruits and processed foods including refined starches and sugars (Katz & Meller, 2014).
The Oligo-antigenic Diet	A diet which seeks to eliminate common food antigens, including dairy products, wheat, egg, chocolate, nuts and citrus fruits. Those on this diet are typically restricted to foods considered to be hypoallergenic, including; lamb, potato, tapioca, carrot, peas and pear (Millichap & Lee, 2012).
Specific Carbohydrate Diet	A diet which is predicated on the view that under certain conditions, most carbohydrates and some proteins are unable to be completely digested. Within this diet, only carbohydrates which are “pre-digested” are allowed. Amongst other foodstuffs, the diet excludes grains, processed foods, starchy vegetables, sugar and dairy (with the exception of homemade fermented yoghurt) (Gotschall, 2004).

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Psychologist Attitudes, Self-Reported Competence and Practices associated  
with the use of Dietary Interventions for Children Presenting for Psychological  
Treatment.

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### Abstract

**Objective:** Despite having limited evidence, research indicates that children with neurodevelopmental and psychological disorders are readily having dietary interventions incorporated into their treatment. Little is known about psychologist's role in influencing these treatment decisions. This study sought to explore psychologist attitudes, self-reported competence and practices associated with the use of dietary interventions for children presenting for psychological treatment. **Method:** A self-report survey was used to obtain data from 60 Australian psychologists working with children. The survey comprised of the Nutritional Competence Tool, (NUTCOMP), and questions pertaining to current practices. **Results:** Overall, psychologists reported positive attitudes towards nutrition care. The incorporation of dietary interventions into clinical practice was common, with 56.7% (n=34) reporting they would be at least somewhat likely to recommend one or more of the dietary interventions listed for one of the conditions explored. Participants indicated that they were most likely to recommend the gut and psychology diet, and were most likely endorse the use of dietary interventions for children presenting with oppositional defiant disorder, conduct disorder or other behavioural problems. **Conclusion:** Despite rigorous training in evidence based practice, these findings suggest psychologists are susceptible to recommending dietary interventions with limited evidence base. The conditions for which recommendations were most likely to be made, as well as diets most commonly recommended had hallmark features of "fads", raising several ethical concerns. The current findings indicate a need to educate psychologists about fad diets. Further research is required to explore individual factors which render psychologists susceptible to fad interventions.

**Keywords:** attitudes; child psychology; dietary interventions; behaviour disorder; fads diets; psychologists

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What is already known about this topic	What this paper adds
1. Dietary interventions do not have a robust evidence-base in treating psychological and neurodevelopmental disorders	1. Psychologists have positive attitudes towards Nutrition Care.
2. Children often receive dietary modification to aid the amelioration of symptoms of psychological and neurodevelopmental disorders	2. Psychologists commonly report that they are likely to recommend dietary interventions for children presenting for psychological treatment
3. Limited previous research suggests that psychologists may be recommending a range of complementary and alternative therapies within their practice.	3. This paper highlights the need for psychologists to remain abreast of current evidence and ethical responsibilities prior to recommending dietary modifications to clients.

Recently, associations between the microbiome and brain function has received increasing attention from researchers. Gut microbiota are the diverse, multitude of micro-organisms living within the gastrointestinal tract (Kraus, Çetin & Aricioglu, 2016). They influence metabolic functioning, and subsequently, the overall health of their host (Ceppa, Mancini & Tuohy, 2019). Various factors including diet and nutrient intake play a critical role in influencing the composition of gut-microbiota (Ceppa et al. 2019; David et al., 2014).

The field of microbiomic research is in its infancy. Current understandings are largely informed by germ-free animal studies and generalisability to human subjects has not been established (Al-Ashmakh & Zadjali, 2015; Kennedy, King & Baldrige, 2018; Luczynski et al. 2016). Recent studies identified associations between the presence and abundances of certain types of microbiota and psychological disorders, including schizophrenia, depression and bipolar disorder (Dickerson, Severence & Yolken, 2017; Fond et al. 2015; Nguyen, Kosciolk, Eyler, Knight & Jeste, 2018; Wong et al. 2016), as well as neurodevelopmental disorders such as autism spectrum disorders (ASDs) (Finegold et al. 2010; Wang et al. 2011). These studies provide further evidence for the association between the gut and mental health, offering hope for new, more effective treatments. Despite these advances, little is understood about exactly how gut-microbiota impact brain functioning, and how brain functioning influences the balance of specific microbiota in the gut (Ceppa, Mancini & Tuohy, 2019). These limitations impede the extent to which these associations can be used to inform the treatment of various psychological disorders (Macqueen, Surette & Moayyedi, 2017;

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Quigley, 2017). Thus, whilst the field has potential to offer new pathways for intervention, more research is required before interventions targeting the microbiome will have sufficient evidence to warrant their use in everyday practice.

The burgeoning interest in diet and mental health has been mirrored within the broader population. Media reports, blogs and advertisements discussing the latest diets offering cures for a host of physical and psychological ailments are common. These diets are often promoted as offering miraculous, and unprecedented results. Arguably, this hype has seen complex, scientific concepts adopted within non-scientific populations. This often results in reductionist understandings, and the subsequent premature development of fad treatments for myriad of conditions (Camilleri, 2019; Quigley, 2016).

With the current focus on diet, it is unsurprising that dietary interventions have become increasingly popular in the treatment of children with neurodevelopmental and psychological disorders. Studies into the use of dietary modifications for children with Autism Spectrum Disorders (ASDs) have shown that over 50% children with the condition have received some type of dietary manipulation within their lifetime (Senel, 2010; Windburn et al. 2014; Wong & Smith, 2006). Children with Attention Deficit-Hyperactivity Disorder (ADHD) are also readily placed on modified diets and use vitamin and/or mineral supplements. Research has reported that 66% of children with ADHD have been placed on a modified diet within their lifetime, and 28% have used vitamin and/or mineral supplements (Sinha & Efron, 2005; Treat et al. 2014).

The frequent use of dietary therapies is cause for concern. Despite scientific advances, the evidence-base supporting dietary interventions is limited (Jacka, 2017; Madzhidova & Sedrakyan, 2019). The uptake of these interventions is perpetuated by the belief that dietary interventions offer a harmless alternative to mainstream, evidence-based interventions (Goin-Kochel, et al 2007; Sax, 2015; Windburn et al. 2014). Conversely, these approaches can lead individuals away from effective treatments, and in many instances pose identifiable risks to the individual (Tuzikow & Holburn, 2011). Studies into the use of complementary and alternative therapies amongst children with Autism Spectrum Disorder have identified that approximately 4-9% of this population have used a treatment which has been identified as potentially harmful (Levy, Mandell, Merhar, Ittenbach & Pinto-Martin 2003; Perrin, Coury, Hyman, Cole, Reynolds & Clemons, 2012).

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Diet therapies have been associated with undesirable health, financial, social outcomes (Sax, 2015; Zane, Davis & Rosswurm, 2008). Broadly speaking, any dietary modifications or restrictions place individuals at increased risk of nutritional deficiencies (Kirby & Danner, 2009). Gluten free diets have been associated with deficiencies in B-vitamins, folate and iron (Reilly, 2016; Shepherd & Gibson, 2013). In children with ASDs, concern has been raised about reduced levels of essential amino acids (Arnold, Hyman, Mooney, & Kirby, 2003). Similarly, reductions in vitamin-D and calcium intake, as well as reduced bone density in children with ASDs on modified diets have also been identified (Hediger, England, Molloy, Yu, Manning-Courtney & Mills, 2008; Mulloy, Lang, O'Reilly, Sigafos, Lancioni & Rispoli, 2010). Similarly, Zupec-Kania and Spellman (2008), reported inadequate intake of a large number of vitamins and minerals, including vitamin D, vitamin K, calcium and fibre amongst children on the paleolithic diet. In addition to this, specific health risks have been associated with dietary modification. For example, the gluten free diet has been associated with higher calorie and fat intake, obesity, metabolic syndrome and new-onset insulin resistance (Kabbani et al 2012; Reilly et al 2011; Tortora et al 2015; Ukkola et al 2012). Implementation of the ketogenic diet is associated with constipation and growth retardation (Zupec-Kania & Spellman, 2008). There has also been concern about the association between uptake of the ketogenic diet and liver abnormalities (Arslan et al. 2016).

Risks associated with dietary modifications are not limited to health complications.

Implementation of dietary modifications require time and financial resources (Millichap & Yee, 2012; Reilly, 2016; Stevens & Rashid, 2008; Worosz & Wilson, 2012). Social isolation, stigma and stress associated with the inconvenience of having a modified diet are often reported by children undergoing dietary manipulation (Jordan et al. 2013), and dietary modification has been associated with a reduction in quality of life in some samples (Deepak, Berry, Vaiphei, Dhaka, Sinha & Kochhar 2018; Simsek, Baysoy, Gencoglan & Uluca, 2015; Jordan et al. 2013).

Some limited research has attempted to understand the factors which influence parental uptake of specific therapeutic interventions. This research has identified that limitations of evidence-based interventions may play a role. Many evidence-based interventions have notable shortcomings. For example, behavioural interventions require time and emotional investment (Hock, Kinsman & Ortaglia, 2015; Tuzikow & Holburn, 2011), and pharmacological interventions can be stigmatized and can cause undesirable side-effects

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(Amitai, Chen, Weizman & Apter, 2015; Reid et al. 2015; Safavi, Saberzadent & Tehrani, 2019). As such, parents seek more appealing treatments, which may have limited empirical evidence (Zane, Davis & Rosswurm, 2008). Another factor may be the abundance of often conflicting information and treatment avenues parents receive at the time of diagnosis. If parents do not have the resources to effectively evaluate the current evidence base for each of these approaches, the uptake of non-evidence based interventions may be more likely (Zane, Davis & Rosswurm, 2008). In identifying treatments, parents have been found to obtain information from a diversity of sources of varying credibility, including other parents, family members, books and blogs (Carlon, Carter & Stephenson 2013; Carlon, Carter & Stephenson, 2015; Miller et al. 2012). Healthcare providers have also been identified as key source of information for parents of children with psychological and neurodevelopmental disorders (Miller et al. 2012).

Despite being a common source of information, and having an ethical responsibility to engage in evidence based practice, research has identified that health practitioners are often unaware of the widespread use of complementary and alternative therapies, (CATs) by children with psychological and neurodevelopmental disorders (Miller, 2012; Tuzikow & Holburn, 2011). Moreover, their knowledge of the evidence supporting these interventions is often limited (Miller, 2012; Tuzikow & Holburn, 2011). If practitioners are unaware of their client's use of CAT they are unable to provide advice about these. Moreover, lack of awareness of the scientific evidence for CATs renders practitioners vulnerable to recommending un-evidenced, potentially harmful treatments, as well as being unable to discourage uptake or continuation of these interventions. Invariably, these challenges have seen practitioners perpetuating the uptake of non-evidence-based interventions (Miller, 2012; Tuzikow & Holburn, 2011).

Specific research into the attitudes and practices of psychologists towards CATs, including diet therapies, for children is scarce. That which does exist, suggests that psychologist knowledge of these interventions is limited (Liem & Newcombe, 2017). Whilst attitudes towards CATs are generally positive, psychologists are reluctant to incorporate this into treatment due to multiple factors including concerns about the scientific validity of these treatments, adherence to codes of conduct, concerns about negative evaluation from colleagues and concerns about litigation (Hamilton & Marietti, 2017; Liem & Newcombe, 2017; Wilson & White, 2011). Whilst this reluctance is positive, it is noteworthy that a

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significant amount of research exploring this has involved face-to-face interviews (see for example: Hamilton & Marietti, 2017; Liem, 2019; Wilson & White, 2011). Given concerns about breaching codes of ethical conduct, and negative evaluation from colleagues are cited as reasons not to implement these approaches within treatment, these studies may be subject to social desirability bias'. One further study used an anonymous survey to examine beliefs underlying psychologist's willingness to integrate CATs. This study suggested CAT integration was occurring more frequently within psychological practice. Within this sample, of 119 participants, 31.1% were identified as having high intention to recommend some form of CAT within their practice. A further 61% of participants indicated a willingness to recommend CATs within their practice. These findings suggest that, despite concerns, psychologists may commonly be integrating CATs into their clinical practice. To date, research in this area has been general, focussing on a range of CATs (for example see; Hamilton & Marietti, 2017; Liem & Newcombe, 2017; Liem 2019; Wilson & White 2011, Wilson et al., 2013). Broadly speaking, evidence for individual CATs is highly variable, and this variability may influence psychologist attitudes and practices associated with individual interventions (Hamilton & Marietti, 2017). Accordingly, the generalisability of these findings specifically to dietary interventions may be limited.

Nevertheless, based on what is known about the prevalence of dietary modification in children with psychological and neurodevelopmental disorders, as well as psychologist attitudes and use of CATs there is evidence to suggest that psychologists may be perpetuating the uptake of these interventions. This research seeks to build on previous research by exploring psychologist's attitudes, self-reported competence and practices associated with the use of dietary interventions for children presenting for psychological treatment. Based on what has previously been established within the literature, we hypothesize that;

1. Psychologists will hold positive attitudes towards dietary interventions, and
2. Some psychologists will be incorporating dietary interventions in their treatment of children presenting in clinical practice.

## Method

### Participants

A purposeful sampling technique was used to recruit psychologists holding full registration to



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practice psychology in Australia. A total of 610 registered psychologists working with children were identified as potential participants through publicly available databases of psychologists in Australia. These individuals were contacted via email and invited to participate in a study on psychologist knowledge, practices and attitudes towards dietary intervention for child clients. The project was further promoted through professional forums accessed by registered psychologists.

A total of 61 participants commenced the survey. One participant only provided demographic information and therefore was excluded from analysis. This left 60 participants in the final dataset. Fifty-three participants (88.3%) were female and the remaining 7 (11.7%) were male. Most participants (n=53, 88.3%) reported their principal place of practice as being within the private sector. Six participants (10%) reported they primarily worked within the public sector, and the remaining 1 participant was employed within the non-government sector. Approximately half of the sample (n= 32, 53.3%) reported having at least one area of endorsement, and 3 participants (5%), held endorsements in 2 areas. The most commonly reported area of endorsement was Clinical, with 24 respondents (40%) indicating they were endorsed in this area. Endorsements in the areas of Educational and Developmental Psychology (n=5, 8.3%), Clinical Neuropsychology (n=2, 3.3%), Health Psychology (n=2, 3.3%) and Community Psychology (n=1, 1.7%) were also reported. Length of time in practice ranged from less than 1 year, to 52 years, with a mean time in practice of 16.64 years (SD=11.74).

### **Materials**

A questionnaire was developed to obtain data of the 3 variables of interest; attitudes towards diet and nutrition care; self-reported nutrition competence and the use of dietary interventions in clinical practice. Demographic data, including data on participant's areas of endorsements and years in practice, were also collected (Refer to Appendix A for questionnaire).

Participants were asked "*How relevant do you believe diet is to the treatment of...*" for anxiety disorders, attention deficit/hyperactivity disorder (ADHD), autism spectrum disorders (ASDs), depressive disorders, oppositional defiant disorder, conduct disorder and other behavioural problems, and psychotic disorders. Participants who indicated they believed diet to be either "somewhat relevant", "very relevant" or "extremely relevant" were then directed

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to further questions to obtain data of their use of dietary interventions in clinical practice (Refer to Appendix B for brief description of dietary interventions included).

**The Nutrition Competence Tool (NUTCOMP).** The NUTCOMP uses 4 constructs to assess self-perceived nutrition competence; confidence in knowledge about nutrition and chronic disease, confidence in nutrition skills, confidence in communication and counselling about nutrition and attitudes towards nutrition care. For the first 3 of these constructs, participants are asked to respond items by indicating their level of confidence, based on a 5-point Likert scale of (1) not confident at all, (2) not very confident, (3) somewhat confident, (4) very confident and (5) extremely confident. Sample questions include: “*How confident are you in your knowledge of how different body systems are affected by food and nutrients*” (confidence in knowledge about nutrition and chronic disease); “*How confident are you in your ability to interpret data about height, weight and body composition against reference ranges*” (confidence in nutrition skills); and “*How confident are you in your ability to clearly describe what patients/clients can expect from their discussions with you about food and nutrition*” (confidence in communication and counselling about nutrition). For the final construct, attitudes towards nutrition care, participants were asked to respond to questions, on a 5-point Likert scale, indicating their agreeance with 8 statements; (1) completely agree, (2) somewhat agree, (3) neither agree or disagree, (4) somewhat disagree, (5) completely disagree. Sample items include; “*It is important that all individuals usually eat healthy foods regardless of age, body weight and physical activity levels*”. Attitudes towards diet and nutrition were assessed using the “attitudes towards nutrition care” subscale of this tool, and self-perceived nutrition competence was assessed by examining scores on the other subscales, as well as the total NUTCOMP score (NUTCOMP; Ball & Leveritt, 2015).

Ball and Leveritt (2015) determined the measure was able to differentiate between two groups with differing levels of nutrition knowledge, dieticians and speech pathologists, suggesting the measure has good concurrent validity. Internal consistency has also been measured, yielding a Cronbach’s  $\alpha$  of 0.88 or above for each of the 4 subscales, as well as the overall tool, demonstrating a high level of internal consistency. The measure has produced very high test-re-test reliability, (0.95) over a 2-3 week period (Ball & Leveritt, 2015).

### **Procedure**

Ethics approval was obtained from the University of Adelaide Human Research Ethics Committee (19/05). Study information was distributed to potential participants via email and

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through professional forums commonly accessed by psychologists in Australia. This material invited prospective participants to participate in a survey exploring psychologist attitudes, knowledge and practices associated with the use of dietary interventions for paediatric clients. Recruitment material provided a link to further information about the project. Having viewed this information, potential participants were able to access the survey via a hyperlink. Consent was implied through completion of the survey. Descriptive statistics were obtained using SPSS v.26. Independent Samples *t*-tests were also undertaken in SPSS to compare attitudes towards nutrition care, as measured by the “Attitudes towards Nutrition Care” subscale of the NUTCOMP, and self-reported nutrition competence, as measured by total NUTCOMP scores, with a reference population of speech pathologists and dieticians (Ball & Leveritt, 2015). The NUTCOMP does not contain validated cut-off scores, therefore this analysis was undertaken to provide a means of meaningfully interpreting data collected. Effect-size calculations for this analysis was undertaken using an online Cohen’s *d* calculator (Becker, 2000).

### Results

To maximize data, data for participants who did not complete the entirety of the questionnaire, were included to the last point in which their responses could meaningfully contribute to the dataset.

#### Attitudes towards Diet and Nutrition Care

Of the participants that responded to questions about the relevance of diet in the treatment for all conditions ( $n=55$ ), only 1 participant (1.8%) reported that diet was not relevant to the treatment of any of the conditions listed. Thirty-six participants (65.5%) reported that they believed diet was at least somewhat relevant to all 5 disorders/groups of disorders. Thirteen participants (23.6%) indicated that diet was extremely relevant to at least one of the conditions/groups of disorders listed.

Psychologists, ( $M=31.23$ ,  $SD=4.26$ ) scored comparatively to dieticians ( $M=32.3$ ,  $SD=2.8$ ,  $t(80.4) = -1.625$ ,  $p=.108$ , two tailed;  $d=-0.3$ , 95% CI = -2.388, 0.241) on the “Attitudes towards Nutrition Care” subscale of the NUTCOMP.

Psychologists ( $M=31.23$ ,  $SD=4.26$ ) scored significantly higher than speech pathologists ( $M=23.1$ ,  $SD=4.3$ ,  $t(85)=8.65$ ,  $p < 0.001$ ;  $d=1.9$ , 95% CI= 6.258, 9.995). The effect size for

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this analysis ( $d=1.9$ ) was found to exceed Cohen's (1977) convention for a large effect ( $d=0.8$ ). This suggests that psychologists held more favourable attitudes towards nutrition care than speech pathologists.

### Self-Reported Nutrition Competence

Psychologists ( $M=103.98$ ,  $SD = 16.312$ ) scored significantly lower than dietitians, ( $M=145.5$ ,  $SD=14.9$ ) on total NUTCOMP scores, ( $t(135) = -15.31$ ,  $p < 0.001$ , two-tailed,  $d=2.658$ , 95% CI= -46.882, -36.156). The effect size for this analysis ( $d=2.658$ ) was above Cohen's (1977) cut-off for a large effect size. This indicates that psychologist's self-reported competence was significantly below that of dietitians.

Psychologist's ( $M=103.98$ ,  $SD=16.312$ ) scored significantly higher than speech pathologists, ( $M=90.5$ ,  $SD=16.3$ ), on total NUTCOMP scores, ( $t(85)=3.76$ ,  $p < 0.001$ , two-tailed,  $d=0.827$ , 95% CI= 8.357, 20.605). The effect size ( $d=0.827$ ) was above Cohen's (1977) cut off for a large effect size. This indicates that psychologist's self-reported competence was significantly higher than speech pathologists.

Psychologists' ( $M=17.08$ ,  $SD=5.46$ ) scored significantly lower than dietitians, ( $M=26$ ,  $SD=4.2$ ), on the confidence in knowledge about nutrition and chronic disease subscale of the NUTCOMP. The assumption of equal variances was not met, therefore a  $t$  statistic not assuming homogeneity of variance was calculated, ( $t(90.199)= -10.945$ ,  $p < 0.001$ , two-tailed,  $d= -0.703$ , 95% CI=-11.366, -7.874). The effect size ( $d=0.703$ ) was above the cut-off established by Cohen (1977) for medium effect size, indicating psychologist's confidence in knowledge of nutrition and chronic disease was significantly below that of dietitians.

Psychologists' ( $M=17.08$ ,  $SD=5.46$ ) scored similarly to speech pathologists ( $M=16.3$ ,  $SD=4.6$ ) on the confidence in knowledge about nutrition and chronic disease subscale of the NUTCOMP, ( $t(85)= 690$ ,  $p=0.492$ , two-tailed, 95% CI= -1.467-3.027).

Psychologists' ( $M=25.85$ ,  $SD=8.6$ ) scored significantly lower than dietitians, ( $M=48.7$ ,  $SD=5.2$ ) on the confidence in nutrition skills subscale of the NUTCOMP. For this analysis, the assumption of equal variances was violated, and therefore a  $t$  statistic not assuming homogeneity of variance was calculated, ( $t(76.217)= -17.436$ ,  $p < 0.001$ , two-tailed,  $d=-0.849$ , 95% CI =-25.460, -20.24). The effect size ( $d=0.849$ ) was above the established cut-off for a

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large effect (Cohen, 1977), indicating psychologists' confidence in nutrition skills was significantly below that of dietitians.

Psychologists', (M=25.85, SD=8.6) scored similarly to speech pathologists (M=22.8, SD=7.6) on the confidence in nutrition skills subscale of the NUTCOMP, ( $t(85)=1.687$ ,  $p=0.95$ , two-tailed, 95% CI= -0.544, 6.644).

Psychologists' (M=29.83, SD=2.83) scored significantly lower to dietitians, (M=37.7, SD=5.7), on the confidence in communicating and counselling about nutrition subscale of the NUTCOMP, ( $t(135) = -9.703$ ,  $p<0.001$ , two-tailed,  $d= -0.434$ , 95% CI= -14.265, -9.435). Cohen's effect size value ( $d= -0.434$ ), suggested a small to moderate practical significance.

Psychologists', (M=29.83, SD=2.83) scored similarly to speech pathologists (M=28, SD=5.5) on the confidence in communicating and counselling about nutrition subscale of the NUTCOMP. The assumption of equal variances was violated, therefore a t test not assuming homogeneity of variance was computed, ( $t(85)=1.422$ ,  $p=0.159$ , two-tailed, 95% CI= -5.156, 0.856).

Table 1<sup>1</sup>

*Comparison of NUTCOMP scores for Psychologists, Dietitians and Speech Pathologists.*

Subscale	Psychologists (n=53)		Dieticians <sup>2</sup> (n=84)		Speech Pathologists <sup>2</sup> (n=34)	
	M	SD	M	SD	M	SD
Confidence in Knowledge about Nutrition and Chronic Disease.	17.08	5.46	26.7* <sup>^</sup>	4.2	16.3	4.6
Confidence in Nutrition Skills	25.85	8.6	48.7* <sup>^</sup>	5.2	22.8	7.6
Confidence in Communication and Counselling about Nutrition	29.83	2.83	37.7 * <sup>^</sup>	5.7	28.0 <sup>^</sup>	5.5
Attitudes towards Nutrition Care	31.23	4.26	32.3	2.8	23.1*	4.3
TOTAL Score	103.98	16.31	145.5	14.9	90.5	16.3

\* significant difference between score and psychologist score ( $P<0.001$ )

<sup>2</sup>Comparison statistics as reported by Ball and Leveritt, (2015).

<sup>^</sup>equal variances not assumed

<sup>1</sup> Tables have been included in text to allow for ease of reading, these will be removed to the end of text as per publication guidelines prior to submission for publication.

### **The Use of Dietary Interventions in Clinical Practice**

Of the 60 participants completing the study, the majority (56.7%, n=34) indicated that they were at least somewhat likely to incorporate at least one of the dietary interventions listed for one or more of the conditions identified in this study.

Of the diets listed, participants were most likely to incorporate the Gut and Psychology Diet (GAPs) diet into treatment, with 30% (n=18) of the total sample indicating that they were at least somewhat likely to recommend this diet for any of the listed conditions.

Participants were most likely to endorse the use of a dietary intervention for Oppositional Defiant Disorder, Conduct Disorder or other Behavioural Problems. Of the 55 participants who responded to questions pertaining to these disorders, 49.1% (n=27), indicated they were at least somewhat likely to incorporate one of the listed dietary modifications into the treatment of these conditions

**Anxiety Disorders.** All 60 participants responded to questions about the use of dietary interventions in the treatment of children with Anxiety disorders. Forty-eight (80%) participants stated they believed that diet was either somewhat, very or extremely relevant to the treatment of anxiety disorders in children. Of these participants, most (56.7%; n =34) reported they would provide general information about diet to these clients. A further 3.3% (n=2) reported they would provide specific information about diet and anxiety. A total of 11.7% (n=7) participants reported that they would incorporate diet into the treatment of children presenting for treatment of an anxiety disorder.

The GAPS diet was most likely to be recommended in the treatment of anxiety disorders, with 11.7 (n=7) participants indicating they would be at least somewhat likely to recommend this for children with an anxiety disorder. This was followed by the Low GI diet with 4.9% (n=3) of respondents indicating they were at least somewhat likely to recommend this diet for a child presenting for the treatment of an anxiety disorder. Magnesium, Probiotics and Fish Oil were the most commonly endorsed supplements, with 6.6% (n=4) participants indicating that would be at least somewhat likely to recommend each of these supplements in the treatment of children presenting for treatment of an anxiety disorder. Participants were most likely to recommend the removal of food colouring and sugar from the diets of this group. A total of 8.3% (n=5) participants indicated they would be at least somewhat likely to recommend the elimination of sugar and food colouring from the diets of children presenting with an anxiety disorder. This was followed by gluten, with 5% (n=3) participants endorsing the elimination of gluten.

**Attention Deficit Hyperactivity Disorder (ADHD).** Questions pertaining to ADHD were answered by 58 participants. Of these, 87.5% (n=51) reported they believed diet was at least somewhat relevant to the treatment of the condition. Four participants (6.9%) reported diet to be extremely relevant, 25 participants (43.1%) believed to be very relevant, and 22 participants (37.9%) reported diet to be somewhat relevant to the treatment of children with ADHD. The majority of participants (50%, n=29) indicated they would provide general information to clients presenting with ADHD. A further 12.1% (n=7) stated they would provide specific information about ADHD and diet, and an additional 17.2% (n=10) indicated they would incorporate this into the treatment of children presenting for treatment of ADHD.

The GAPS diet was most the frequently recommended diet in the treatment of this condition, with 10.3% (n=6) participants reporting they would be at least somewhat likely to recommend this to children with ADHD. This was followed by the total elimination diet (TED), of which 5.2% (n=3) of participants indicated they would be at least somewhat likely to recommend. Seven Participants (12.1%) reported they would be at least somewhat likely to recommend fish oil supplementation, and 5 participants (8.6%) reported they would be at least somewhat likely to recommend the use of magnesium supplementation. Food colourants were the most likely to be recommended to be eliminated from the diets of children with ADHD, with 15.5% (n=9) participants reporting they would be at least somewhat likely to recommend this be eliminated from the diet of a child presenting for treatment of ADHD. Eight participants (13.8%), and 5 participants (8.6%) reported they would be at least somewhat likely to recommend the elimination of sugar and gluten respectively.

**Autism Spectrum Disorders (ASDs).** Fifty-five participants completed the section on the use of dietary interventions in the treatment of ASDs. Of these, 78.2% (n=43) reported they believed diet was extremely relevant (9.1%; n=5), very relevant (29.1%; n=16) or somewhat relevant (40%; n=22). The majority of participants (60%, n=33) who indicated diet to be at least somewhat relevant to the treatment of Autism Spectrum Disorders reported they would provide general information about diet to their clients. A further 3.6% (n=2) reported that they would provide specific information about diet in Autism Spectrum Disorders, and 10.9% (n=6) reported they would incorporate dietary interventions into treatment.

The most commonly recommended diet for ASDs was the GAPS diet, with 7.3 (n=4) participants indicating they would be at least somewhat likely to recommend this in the treatment of children with ASDs. Probiotics were the most frequently reported supplement

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recommended in the treatment of ASDs, with 7.3% (n=4) participants indicating they would be at least somewhat likely to recommend their use in this cohort. Supplementation with fish oil and multi-vitamins were both endorsed by 5.5% (n=3) of respondents. The most common recommendations for elimination from the diet of children with ASDs were sugar and gluten, with 7.3% (n=4) and 5.5% (n=3) of participants respectively indicating they would at least somewhat recommend the elimination of these from the diets of children presenting with ASDs.

**Depressive Disorders.** Fifty-five participants responded to questions on the use of dietary interventions in the treatment of depressive disorders. Of these, 85.5% (n=47), reported they believed diet was extremely relevant (5.5%; n=3), very relevant (41.8%; n=23) or somewhat relevant (38.2%; n=21) to the treatment of these conditions. Most participants (63.6%; n=35) who indicated they believed diet to be at least somewhat relevant to the treatment of depressive disorders indicated they would provide general information about diet and nutrition. Four participants (7.3%) reported they would provide information specific to diet in the treatment of Depressive Disorders, and 6 (10.9%) indicated they would incorporate this into their treatment.

The GAPS diet was the most frequently recommended diet, with 7.3% (n=4) participants indicating that they would be at least somewhat likely to recommend this in their treatment of a child client with a depressive disorder. With regards to recommendation for supplement use in the treatment of depressive disorder, participants most frequently reported that they would be at least somewhat likely recommend the use of fish oil (9.1%; n=5), magnesium (7.3%; n=4) and probiotics (7.3%; n=4). Very few participants indicated that they would recommend any eliminations from the diet of child clients presenting with a depressive disorder. Most frequently reported eliminations were food colourants, gluten and sugar, which were each endorsed by 3.6% (n=2) participants.

**Oppositional Defiant Disorder (ODD), Conduct Disorder (CD) and other behavioural problems.** Fifty-five participants responded to questions on the use of dietary interventions in the treatment of ODD, CD and other behavioural problems. Of these, 78.2% (n=43) reported they believed diet was extremely relevant (n=1), very relevant (n=17) or somewhat relevant (n=25) to the treatment of these conditions. The majority of these participants (49%, n=27) reported they would provide general discussion about diet and nutrition. A further 3 participants (5.5%) reported they would provide specific information about the use of diet in ODD, CD or other behavioural problems. Eight participants, (14.5%)



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stated they would implement this into their treatment.

With regards to recommendations for specific diets, the GAPS diet was most frequently recommended, with 24.6% (n=13) respondents indicating they would definitely recommend (3.6%, n=2), or be somewhat likely (20%, n=11) to recommend this diet to their clients. The use of a multivitamin was the most commonly endorsed form of supplementation for ODD, CD and other behavioural problems. A total of 23.6% (n=8) participants indicated they would be at least somewhat likely to recommend a multivitamin for this group. This was followed by probiotics (18.2%, n=10) and fish oil (16.4%, n=9), which were also commonly reported. Participants were most likely to recommend the elimination of sugar, with 36.4% (n=20) indicating they would be at least somewhat likely to recommend the elimination of sugar from the diet of a child presenting with ODD, CD or behavioural problems. Participants also commonly endorsed the elimination of food colouring (30.9%, n=17) and gluten with this group.

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Table 2:

*Percentage of participants indicating they would be somewhat likely, very likely or definitely recommend the use of specific dietary interventions by condition. (Number of responses in parentheses)*

	<u>Anxiety</u>	<u>ADHD</u>	<u>ASD</u>	<u>Depressive Disorders</u>	<u>ODD/CD and Behavioural Problems</u>
	(n=60)	(n=58)	(n=55)	(n=55)	(n=55)
<b>Diet</b>					
-Failsafe	0 (0)	1.7 (1)	0 (0)	0 (0)	1.8 (1)
-Gut and Psychology Diet	11.7 (7)	10.3 (6)	7.3 (4)	7.3 (4)	24.6 (13)
-Ketogenic Diet	3.3 (2)	3.4 (2)	1.8 (1)	1.8 (1)	7.3 (4)
-Low GI Diet	5 (3)	3.4 (2)	1.8 (1)	3.6 (2)	9.1 (5)
-Total Elimination Diet (TED)	1.6 (1)	5.2 (3)	0 (0)	0 (0)	5.5 (3)
-Palaeolithic (Paleo) Diet	1.7 (1)	1.7 (1)	1.8 (1)	1.8 (1)	1.8 (1)
-Specific Carbohydrate Diet	3.3 (2)	0 (0)	0 (0)	0 (0)	1.8 (1)
<b>Supplements</b>					
-B6	5 (3)	3.4 (2)	1.8 (1)	1.8 (1)	5.5 (3)
-B12	3.3 (2)	3.4 (2)	1.8 (1)	3.6 (2)	5.5 (3)
-Vitamin C	3.3 (2)	3.4 (2)	1.8 (1)	1.8 (1)	7.3 (4)
-Fish Oil	6.6 (4)	12.1 (7)	5.5 (3)	9.1 (5)	16.4 (9)
-Folate	1.7 (1)	5.2 (3)	1.8 (1)	1.8 (1)	3.6 (2)
-Magnesium	6.6 (4)	8.6 (5)	1.8 (1)	7.3 (4)	9.1 (5)
-Multi-Vitamin	5 (3)	5.2 (3)	5.5 (3)	3.6 (2)	23.6 (8)
-Probiotics	6.6 (4)	5.2 (3)	7.3 (4)	7.3 (4)	18.2 (10)
-Zinc	5 (3)	5.2 (3)	3.6 (2)	5.5 (3)	7.3 (4)
<b>Elimination</b>					
-Amines	1.7(1)	5.2(3)	0 (0)	0 (0)	5.5 (3)
-Dairy	1.7 (1)	1.7 (1)	1.8 (1)	0 (0)	9.1 (5)
-Casein	1.7 (1)	3.4 (2)	1.8 (1)	0 (0)	7.3 (4)
-Corn	1.7 (1)	1.7 (1)	0 (0)	0 (0)	3.6 (2)
-Food Colourants	8.3 (5)	15.5 (9)	1.8 (1)	3.6 (2)	30.9 (17)
-Gluten	5 (3)	8.6 (5)	5.5 (3)	3.6 (2)	16.4 (9)
-Sugar	8.3 (5)	13.8 (8)	7.3 (4)	3.6 (2)	36.4 (20)
-Soy	1.7 (1)	5.2 (3)	1.8 (1)	1.8 (1)	5.5 (3)
-Salicylates	3.3 (2)	6.9 (4)	1.8 (1)	1.8 (1)	9 (5)

Note. ADHD=Attention Deficit/Hyperactivity Disorder; ASD= Autism Spectrum Disorder; ODD= Oppositional Defiant Disorder; CD= Conduct Disorder

## Discussion

The current research sought to explore the attitudes, self-reported competence and practices of Australian psychologists towards the use of dietary interventions in the treatment of children presenting for psychological treatment. Overall, results indicate that psychologists believe that diet is relevant to the treatment of psychological and neurodevelopmental disorders in children. Moreover, psychologists within this sample, held positive attitudes towards the use of dietary interventions in this cohort. As expected, self-reported competence was lower than that of dietitians, however, surprisingly greater than that of speech pathologists, who would likely have received more training in the area of dietetics than psychologists. The majority of participants indicated they would be at least somewhat likely to incorporate at least one of the dietary modifications explored in the current study into the treatment of one of the conditions identified.

The findings pertaining to psychologist attitudes towards dietary interventions for children were consistent with that of previous research indicating that psychologists are open to the role of CATs in the treatment of these conditions (Hamilton & Marietti, 2017; Wilson & White, 2007; Wilson, White & Hamilton, 2017; Whilst, White & Obst, 2011). Interestingly, within the current sample, attitudes towards nutrition care were significantly higher than speech pathologists, and comparable to dietitians. This may indicate that psychologists hold positive attitudes towards nutrition care, however these findings should be interpreted with caution. The NUTCOMP measure does not contain empirically validated cut-offs, therefore, this assessment has been made based on comparisons to data available through previous research (Ball & Leveritt, 2015). In the absence of more recent data, these findings may be indicative of more generalised increases in positive attitudes towards nutrition care since the comparison data were collected. Alternatively, these findings may reflect a sampling bias which has resulted from participants being invited to participate in a study focussing on dietary interventions. Nevertheless, these findings are consistent with previous research indicating that psychologists hold positive attitudes towards CATs. Nearly all participants indicated that they believed diet was at least somewhat relevant to the treatment of at least one of the conditions/groups of disorders listed. This may highlight the need for diet and nutrition to receive further attention within psychology training programs to ensure psychologists are equipped to examine the research and provide appropriate guidance and referrals within clinical practice.

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Self-reported nutrition competence was lower than comparison data of dietician's self-reported competence. This finding is to be expected due to the specialised training dieticians receive in the area of diet and nutrition. However, overall this sample reported higher levels of self-reported competence than speech pathologists. These findings were unexpected, as one would anticipate that psychologists receive less training in the area of diet and nutrition than speech pathologists. Ball & Leveritt (2015) view attitudes a factor of competence. In this instance however, examination of scores of the two groups on each subscale, suggest that more favourable attitudes towards nutrition care likely inflated total NUTCOMP scores. As aforementioned, there are multiple hypotheses as to why this difference has emerged. Scores on the subscales, confidence in knowledge about nutrition and chronic disease and confidence in nutrition skills were, as expected significantly lower than dieticians, and similar to that of speech pathologists. This suggests that whilst there is the potential that this sample may have had an interest in nutrition, their skills and knowledge in the area was modest.

Despite scores on the NUTCOMP suggesting this sample did not have specialist skills in this area, the majority were at least somewhat likely to recommend the use of dietary interventions to child clients presenting for at least one of the conditions/groups of conditions listed. Participants were most likely to support dietary modification for the treatment of ODD, CD and other behavioural disorders. For this cohort, participants most commonly endorsed dietary modification through the elimination of food colouring, elimination of sugar or through use of the GAPs diet. These findings are of interest as they reflect divergence from the evidence base within clinical practice. Review of the literature was unable to identify any empirical support for these dietary modifications. The history of dietary modifications for children presenting with psychological and neurodevelopmental disorders, as well as theories of institutional fads may offer insight into these findings. The elimination of food colouring from the diets of children was popularised during the 1970's. At this time it was hypothesized that child hyperactivity, specifically ADHD resulted from food specific antigenic processes (Millichap & Yee, 2012). This saw the emergence of multiple elimination diets, such as the Feingold Diet, Failsafe Diet and Oligo-antigenic diets which targeted food-colouring, preservatives and salicylates as pathogens triggering allergic responses in certain children (Millichap & Yee, 2012). During the late 1970's, sugar also came under similar scrutiny, being positioned as a potential trigger for hyperactivity (Millichap & Yee, 2012).

Given the high rates of comorbidity between ADHD and other disruptive behavioural

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disorders such as ODD, as well as overlap of symptoms (Harvey, Breaux & Lugo-Candalas, 2015), it is unsurprising that treatments which have been used for ADHD would be considered for these conditions. This however does not explain why the use of these diets has seemingly reduced within children with ADHD, yet, at least within this cohort remain popular in the treatment of ODD, CD and other behavioural disorders. Theories on fads may provide some insight into this. Best (2006) describes that such as diet therapies, more readily emerge when conditions have less definitive diagnostic processes, ambiguous, and unclear testing processes, and cause greater functional impairment.

Consistent with this, differences in functional impairment and treatment efficacy for ADHD compared to disruptive and behavioural disorders such as ODD may explain these differences. Effective treatments for disruptive behavioural disorders are commonly behavioural interventions, which whilst have a convincing evidence base, require significant time and effort (Hock, Kinsman & Ortaglia, 2015). This may make these treatments unappealing, particularly in comparison to pharmacologically based interventions, which are more easily accessible to those with ADHD, which are easier to implement (Zisser & Eyberg, 2017). Moreover, the presence of antisocial behaviours, which “violate the rights of others” (American Psychiatric Association, 2013, p. 461) is required for diagnosis of ODD and CD, but not ADHD. These behaviours may lead to increased desperation for find effective treatments, rendering parents and clinicians more vulnerable to undertaking non-evidence based interventions. Thus whilst the use of elimination diets in the treatment of ADHD have largely fallen out of favour as research has failed to demonstrate an effect, the specific symptoms and nature of treatments for ODD, CDs and other behavioural disorders may leave clinicians and parents more willing to explore interventions with a less convincing evidence base.

The other finding of interest was that a significant proportion of participants indicated they were at least somewhat likely to incorporate the GAPs diet for each of the conditions explored within this research. We were unable to identify any studies evaluating the efficacy of the GAPs diet as a treatment for any physical or psychological condition. Again, theories on fads may provide insight into why this diet was commonly supported, despite its complete absence from scientific literature. Best (2006) describes that characteristics of successful fad interventions, many of which are exemplified by the GAPs diet. Successful fads typically offer mono-causal explanations for their efficacy, appealing to a need for rationality (Best,

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2006). The GAPS diet offers “leaky gut” as a causal explanation for the diversity of conditions for which is purportedly treats. Quigley (2016) draws on “leaky gut” as an example of reductionist adoptions of scientific concepts within the general population, leading to the premature uptake of fad diets. Within popular media proponents of the “leaky-gut” suggest that defects in intracellular connections allow toxic substances to permeate the intestinal wall, enter the bloodstream and circulate around the body (Quigley, 2016). This theory presents an over-simplified representation of the gut wall as a single celled, epithelial structure that is highly vulnerable to disruptions to its intracellular junctions (Quigley, 2016). This, simplistic understanding of the gut wall, and how it functions has seen the emergence of so-called “leaky-gut syndrome”. This condition is readily positioned as a primary aetiopathogenic factor in a host of conditions, including fibromyalgia, chronic fatigue syndrome, depression and autism spectrum disorders (Odenwald & Turner, 2013; Quigley, 2016). In turn, dietary interventions, often lacking any empirical support, have been popularised for their purported ability to strengthen the gut barrier, reduce intestinal hyper-permeability, and therefore reduce undesirable symptoms (Quigley, 2016). Whilst this pathogenic pathway bares many similarities to emerging knowledge from research into the microbiome, trials in this area have yet to reliably establish dietary interventions as an effective treatment of psychological or neurodevelopmental disorders (Camilleri, 2019).

Further support for fad interventions is typically offered through anecdotal claims and the support of proponents which offer some “authority” (Best, 2006). Again, these characteristics are evidenced for the GAPS diet. Evidence of the intervention’s efficacy is offered through the founder’s anecdotal claims of symptomatic improvement in her son’s core ASD symptoms (Campbell-McBride, 2005; 2008; 2018). Appeal to authority is provided through the founder’s qualifications in neurobiology and human nutrition (Campbell-McBride, 2005; 2008; 2018). Best (2006) further describes that interventions which offer solutions, to multiple problems, coupled with clear strategy, or “recipe” for application are also recognised as traits of popular fads (Best, 2006; Travers, Ayers, Simpson & Crutchfield, 2016) The GAPS diet meets both of these conditions, offering clear step-by step instructions, which are purported to yield improvements in the symptoms of ASDs, ADHD, dyslexia, schizophrenia and Obsessive Compulsive Disorder (Campbell-McBride, 2005; 2008; 2018). These features lead professionals to view increasing knowledge of these interventions to be an effective use of time, believing they will allow straightforward treatment of a diversity of conditions (Best, 2006). Invariably, in the absence of robust research for this diet, these

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characteristics would suggest that the observed support of the GAPs diet within the current sample was reflective of a vulnerability to fad interventions.

Given this, these findings illuminate a number of ethical concerns. Psychologists have an obligation to provide advice and treatment which is consistent with high-quality evidence base, and within their scope of practice (Australian Psychological Society, 2007; Levan & Hasan, 2008). This not only ensures clients have access to effective treatment, but are protected from unnecessary risks which may be associated with these interventions (Australian Psychological Society, 2007; Levan & Hasan, 2008). The integration of dietary interventions such as the GAPs diet, which lack a scientific evidence base reflects a deviation from this.

Whilst the current study may be limited due to its small sample size and potential sampling bias, these findings illuminate a need to inoculate the profession from the influence of fad interventions. Research into fads consistently cites a commitment to evidence-based practice as the antidote (Best, 2006; Paris, 2013). The current findings suggest, despite a strong emphasis on the scientific method in psychology training programs, and within regulatory codes and ethical guidelines, psychologists remain vulnerable to the influence of fad interventions. Given the current findings, and that of previous research which suggests psychologists hold positive attitudes towards CATs, including diet therapies, providing greater attention to the intersect between diet and psychological health within psychology training programs may help ensure psychologists are supported to pursue this interest within the bounds of evidence-based practice. Moreover, the development of practice guidelines to inform the integration of CATs into psychological practice may allow for the benefits of CAT integration to be realised within clinical settings, without a deviation from the high levels of empiricism called for by the profession. Potentially, further research is required to identify the characteristics which render individual psychologists particularly vulnerable to these interventions, as this may provide clearer avenues for effectively addressing this vulnerability.

To date, research has failed to establish robust evidence supporting the widespread use of dietary interventions for the treatment of psychological and neurodevelopmental disorders in children. As such, the integration of these approaches into clinical practice is premature. This is not to suggest a complete abandonment of novel treatments. Invariably, research into new

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treatments is necessary for progress. Emerging knowledge from microbiomic research offers hope for new treatment potentials, and the abandonment of research in this area may see effective treatments overlooked. However, new interventions need to be trialled in appropriate settings, where outcomes are monitored, and participants are aware of the potential limitations and risks associated with the interventions.



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## DIETARY INTERVENTIONS FOR CHILDREN

### Appendix A: Supplementary Material: Questionnaire

#### Demographics

1. What is your age range?
2. What is your gender? [Male; Female; Other (please specify)]
3. Which best describes your principle place of practice?  
[Public Sector; Private Sector; Non-Government; Other (please specify)]
4. Which best describes your primary clientele  
[Children; Adolescents; Children and Adolescents; Adults; A combination of Children; Adolescents and Adults; Other (please specify)]
5. Area/s of Endorsement (if any):  
[Clinical Neuropsychology; Clinical Psychology; Community Psychology; Counselling Psychology; Educational and Developmental Psychology; Forensic Psychology; Health Psychology; Organisational Psychology; Sports and Exercise Psychology]
6. How many years have you been working as a psychologist?

#### Nutrition Training

7. Which of the following best describes your previous nutrition training?  
[ I have completed a Certificate or other non-degree course that did not include nutrition content; I have completed a Certificate or other non-degree course that included some nutrition content; I have completed a certificate or other non-degree course that was predominantly focused on nutrition; I have completed a degree that did not include any nutrition Content; I have completed a degree that included some nutrition Content; I have completed a degree that was predominantly focused on nutrition]
8. Have you ever participated in any professional development or continuing education on the topic of Nutrition?  
[yes; no]
9. I feel I need further nutrition education to support me in my current role  
[yes; no]

#### Dietary Interventions

##### Anxiety Disorders

10. How relevant do you feel diet is to the treatment of Anxiety Disorders in children?  
[Not at all relevant; Somewhat Relevant; Very Relevant; Extremely Relevant]

*(Participants who indicated that diet was “not at all relevant” to the treatment of this condition, skipped to the next section on ADHD)*

11. For children presenting for treatment of an Anxiety Disorder, which of the following best describes the referrals you would offer to provide support with diet and nutrition?  
[I would not provide/discuss a referral to another health care Provider; I would provide/discuss a referral to a traditional health care provider (e.g. Dietitian, General Practitioner); I would provide/discuss a referral to a Complementary/Alternative Medicine (CAM) provider (e.g. Naturopath); I would provide/discuss referrals to both traditional healthcare providers (e.g. Dietitian, General Practitioner) and Complementary/Alternative Medicine (CAM) provider (e.g. .Naturopath)]
12. For children presenting for treatment of an Anxiety Disorder, how much information are you likely to provide about diet and their condition?  
[I would not discuss diet with my client/caregiver; I would provide general information about diet and nutrition; I would provide specific information about diet and Anxiety Disorders, but not incorporate this into treatment; I would provide specific information about diet and Anxiety Disorders and incorporate this into treatment]

*(Participants who indicated that “I would not discuss diet with my client/caregiver” or I would provide general*



## DIETARY INTERVENTIONS FOR CHILDREN

*information about diet and nutrition did not complete further questions on Anxiety Disorders, and skipped to the next section on ADHD)*

13. How likely are you to recommend the following diets or approaches for children presenting for the treatment of an Anxiety Disorder?

- DAN Protocol (Defeat Autism Now) – [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Failsafe Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- GAPS Diet (Gut and Psychology) [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Ketogenic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Low Glycaemic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Total Elimination Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Paleolithic Diet (Paleo) - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Specific Carbohydrate Diet [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other diets you would recommend for the treatment of an Anxiety Disorder? (Please Specify)

14. How likely are you to recommend the following supplements for children presenting for treatment of an Anxiety Disorder?

- Vitamin B6 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin B12 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin C - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Fish Oil - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Folate - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Magnesium - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Multivitamin - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Probiotics - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Zinc - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other supplements you would recommend for children presenting for the treatment of an Anxiety Disorder? (please specify)

15. How likely are you to recommend the elimination of the following from the diet of children presenting for the treatment of an Anxiety Disorder?

- Dairy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Casein- [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Corn - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Food Colourants - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Gluten - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Sugar - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Soy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Salicylates - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Is there anything else you would recommend eliminating from the diet of a child presenting for treatment of an Anxiety disorder? (please specify)

### Attention Deficit/Hyperactivity Disorder

16. How relevant do you feel diet is to the treatment of Attention Deficit/Hyperactivity Disorder in children?  
[Not at all relevant; Somewhat Relevant; Very Relevant; Extremely Relevant]

*(Participants who indicated that diet was “not at all relevant” to the treatment of this condition, skipped to the next section on ASDs)*

## DIETARY INTERVENTIONS FOR CHILDREN

17. For children presenting for treatment of Attention Deficit/Hyperactivity Disorder, which of the following best describes the referrals you would offer to provide support with diet and nutrition?

[I would not provide/discuss a referral to another health care Provider; I would provide/discuss a referral to a traditional health care provider (e.g. Dietitian, General Practitioner); I would provide/discuss a referral to a Complementary/Alternative Medicine (CAM) provider (e.g. Naturopath); I would provide/discuss referrals to both traditional healthcare providers (e.g. Dietitian, General Practitioner) and Complementary/Alternative Medicine (CAM) provider (e.g. .Naturopath)]

18. For children presenting for treatment of Attention Deficit/Hyperactivity Disorder, how much information are you likely to provide about diet and their condition?

[I would not discuss diet with my client/caregiver; I would provide general information about diet and nutrition; I would provide specific information about diet and Anxiety Disorders, but not incorporate this into treatment; I would provide specific information about diet and Anxiety Disorders and incorporate this into treatment]

*(Participants who indicated that “I would not discuss diet with my client/caregiver” or I would provide general information about diet and nutrition did not complete further questions on Attention Deficit/Hyperactivity Disorder and skipped to the next section on ASDs)*

19. How likely are you to recommend the following diets or approaches for children presenting for the treatment of Attention Deficit/Hyperactivity Disorder?

- DAN Protocol (Defeat Autism Now) – [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Failsafe Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- GAPS Diet (Gut and Psychology) [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Ketogenic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Low Glycaemic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Total Elimination Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Paleolithic Diet (Paleo) - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Specific Carbohydrate Diet [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other diets you would recommend for the treatment of Attention Deficit/Hyperactivity Disorder? (Please Specify)

20. How likely are you to recommend the following supplements for children presenting for treatment of Attention Deficit/Hyperactivity Disorder?

- Vitamin B6 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin B12 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]-
- Vitamin C - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Fish Oil - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Folate - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Magnesium - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Multivitamin - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Probiotics - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Zinc - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other supplements you would recommend for children presenting for the treatment of Attention Deficit/Hyperactivity Disorder? (please specify)

21. How likely are you to recommend the elimination of the following from the diet of children presenting for the treatment of Attention Deficit/Hyperactivity Disorder?

- Dairy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Casein- [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Corn - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Food Colourants - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Gluten - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Sugar - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

## DIETARY INTERVENTIONS FOR CHILDREN

- Soy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Salicylates - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Is there anything else you would recommend eliminating from the diet of a child presenting for treatment of Attention Deficit/Hyperactivity Disorder? (please specify)

### Autism Spectrum Disorders

22. How relevant do you feel diet is to the treatment of Autism Spectrum Disorders in children?

[Not at all relevant; Somewhat Relevant; Very Relevant; Extremely Relevant]

*(Participants who indicated that diet was “not at all relevant” to the treatment of this condition, skipped to the next section on Depressive Disorders)*

23. For children presenting for treatment of Autism Spectrum Disorder, which of the following best describes the referrals you would offer to provide support with diet and nutrition?

[I would not provide/discuss a referral to another health care Provider; I would provide/discuss a referral to a traditional health care provider (e.g. Dietitian, General Practitioner); I would provide/discuss a referral to a Complementary/Alternative Medicine (CAM) provider (e.g. Naturopath); I would provide/discuss referrals to both traditional healthcare providers (e.g. Dietitian, General Practitioner) and Complementary/Alternative Medicine (CAM) provider (e.g. .Naturopath)]

24. For children presenting for treatment of Autism Spectrum Disorder, how much information are you likely to provide about diet and their condition?

[I would not discuss diet with my client/caregiver; I would provide general information about diet and nutrition; I would provide specific information about diet and Anxiety Disorders, but not incorporate this into treatment; I would provide specific information about diet and Anxiety Disorders and incorporate this into treatment]

*(Participants who indicated that “I would not discuss diet with my client/caregiver” or I would provide general information about diet and nutrition did not complete further questions on Anxiety Disorders, and skipped to the next section on Depressive Disorders)*

25. How likely are you to recommend the following diets or approaches for children presenting for the treatment of Autism Spectrum Disorder?

- DAN Protocol (Defeat Autism Now) – [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Failsafe Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- GAPS Diet (Gut and Psychology) [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Ketogenic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Low Glycaemic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Total Elimination Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Paleolithic Diet (Paleo) - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Specific Carbohydrate Diet [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other diets you would recommend for the treatment of Autism Spectrum Disorder? (Please Specify)

26. How likely are you to recommend the following supplements for children presenting for treatment of Autism Spectrum Disorder?

- Vitamin B6 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin B12 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin C - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Fish Oil - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Folate - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Magnesium - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Multivitamin - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Probiotics - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

## DIETARY INTERVENTIONS FOR CHILDREN

- Zinc - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other supplements you would recommend for children presenting for the treatment of Autism Spectrum Disorder? (please specify)

27. How likely are you to recommend the elimination of the following from the diet of children presenting for the treatment of Autism Spectrum Disorder?

- Dairy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Casein- [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Corn - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Food Colourants - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Gluten - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Sugar - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Soy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Salicylates - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Is there anything else you would recommend eliminating from the diet of a child presenting for treatment of Autism Spectrum Disorder? (please specify).

### Depressive Disorders

28. How relevant do you feel diet is to the treatment of Depressive Disorders in children?

[Not at all relevant; Somewhat Relevant; Very Relevant; Extremely Relevant]

*(Participants who indicated that diet was “not at all relevant” to the treatment of this condition, skipped to the next section on Oppositional Defiant Disorder, Conduct Disorder and other Behavioural Problems)*

29. For children presenting for treatment of an Anxiety Disorder, which of the following best describes the referrals you would offer to provide support with diet and nutrition?

[I would not provide/discuss a referral to another health care Provider; I would provide/discuss a referral to a traditional health care provider (e.g. Dietitian, General Practitioner); I would provide/discuss a referral to a Complementary/Alternative Medicine (CAM) provider (e.g. Naturopath); I would provide/discuss referrals to both traditional healthcare providers (e.g. Dietitian, General Practitioner) and Complementary/Alternative Medicine (CAM) provider (e.g. .Naturopath)]

30. For children presenting for treatment of a depressive disorder, how much information are you likely to provide about diet and their condition?

[I would not discuss diet with my client/caregiver; I would provide general information about diet and nutrition; I would provide specific information about diet and Anxiety Disorders, but not incorporate this into treatment; I would provide specific information about diet and Anxiety Disorders and incorporate this into treatment]

*(Participants who indicated that “I would not discuss diet with my client/caregiver” or I would provide general information about diet and nutrition did not complete further questions on Anxiety Disorders, and skipped to the next section on Oppositional Defiant Disorder, Conduct Disorder and other Behavioural Problems)*

31. How likely are you to recommend the following diets or approaches for children presenting for the treatment of a depressive disorder?

- DAN Protocol (Defeat Autism Now) – [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Failsafe Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- GAPS Diet (Gut and Psychology) [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Ketogenic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Low Glycaemic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Total Elimination Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Paleolithic Diet (Paleo) - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Specific Carbohydrate Diet [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other diets you would recommend for the treatment of a depressive disorder? (Please Specify)

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32. How likely are you to recommend the following supplements for children presenting for treatment of a depressive disorder?

- Vitamin B6 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin B12 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]-
- Vitamin C - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Fish Oil - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Folate - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Magnesium - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Multivitamin - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Probiotics - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Zinc - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other supplements you would recommend for children presenting for the treatment of a depressive disorder? (please specify)

33. How likely are you to recommend the elimination of the following from the diet of children presenting for the treatment of a depressive disorder?

- Dairy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Casein- [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Corn - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Food Colourants - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Gluten - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Sugar - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Soy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Salicylates - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Is there anything else you would recommend eliminating from the diet of a child presenting for treatment of a depressive disorder? (please specify)

### Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems

34. How relevant do you feel diet is to the treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems in children?

[Not at all relevant; Somewhat Relevant; Very Relevant; Extremely Relevant]

*(Participants who indicated that diet was “not at all relevant” to the treatment of this condition, skipped to the next section on psychotic disorders)*

35. For children presenting for treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems, which of the following best describes the referrals you would offer to provide support with diet and nutrition?

[I would not provide/discuss a referral to another health care Provider; I would provide/discuss a referral to a traditional health care provider (e.g. Dietitian, General Practitioner); I would provide/discuss a referral to a Complementary/Alternative Medicine (CAM) provider (e.g. Naturopath); I would provide/discuss referrals to both traditional healthcare providers (e.g. Dietitian, General Practitioner) and Complementary/Alternative Medicine (CAM) provider (e.g. .Naturopath)]

36. For children presenting for treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems, how much information are you likely to provide about diet and their condition?

[I would not discuss diet with my client/caregiver; I would provide general information about diet and nutrition; I would provide specific information about diet and Anxiety Disorders, but not incorporate this into treatment; I would provide specific information about diet and Anxiety Disorders and incorporate this into treatment]

*(Participants who indicated that “I would not discuss diet with my client/caregiver” or I would provide general information about diet and nutrition did not complete further questions on Anxiety Disorders, and skipped to the next section on ADHD)*

37. How likely are you to recommend the following diets or approaches for children presenting for the treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems?

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- DAN Protocol (Defeat Autism Now) – [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Failsafe Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- GAPS Diet (Gut and Psychology) [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Ketogenic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Low Glycaemic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Total Elimination Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Paleolithic Diet (Paleo) - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Specific Carbohydrate Diet [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other diets you would recommend for the treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems? (Please Specify)

38. How likely are you to recommend the following supplements for children presenting for treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems?

- Vitamin B6 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin B12 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin C - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Fish Oil - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Folate - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Magnesium - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Multivitamin - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Probiotics - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Zinc - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other supplements you would recommend for children presenting for the treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems? (please specify)

39. How likely are you to recommend the elimination of the following from the diet of children presenting for the treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems?

- Dairy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Casein- [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Corn - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Food Colourants - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Gluten - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Sugar - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Soy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Salicylates - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Is there anything else you would recommend eliminating from the diet of a child presenting for treatment of Oppositional Defiant Disorder, Conduct Disorder and Other Behavioural Problems? (please specify)

### Psychotic Disorders

40. How relevant do you feel diet is to the treatment of Psychotic Disorders in children?

[Not at all relevant; Somewhat Relevant; Very Relevant; Extremely Relevant]

*(Participants who indicated that diet was “not at all relevant” to the treatment of this condition, skipped to the next section, the NUTCOMP)*

41. For children presenting for treatment of Psychotic Disorders, which of the following best describes the referrals you would offer to provide support with diet and nutrition?

[I would not provide/discuss a referral to another health care Provider; I would provide/discuss a referral to a traditional health care provider (e.g. Dietitian, General Practitioner); I would provide/discuss a referral to a Complementary/Alternative Medicine (CAM) provider (e.g. Naturopath); I would provide/discuss referrals to both traditional healthcare providers (e.g. Dietitian, General

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Practitioner) and Complementary/Alternative Medicine (CAM) provider (e.g. .Naturopath)]

42. For children presenting for treatment of Psychotic Disorders, how much information are you likely to provide about diet and their condition?

[I would not discuss diet with my client/caregiver; I would provide general information about diet and nutrition; I would provide specific information about diet and Anxiety Disorders, but not incorporate this into treatment; I would provide specific information about diet and Anxiety Disorders and incorporate this into treatment]

*(Participants who indicated that “I would not discuss diet with my client/caregiver” or I would provide general information about diet and nutrition did not complete further questions on Anxiety Disorders, and skipped to the next section, the NUTCOMP)*

43. How likely are you to recommend the following diets or approaches for children presenting for the treatment of a Psychotic Disorder?

- DAN Protocol (Defeat Autism Now) – [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Failsafe Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- GAPS Diet (Gut and Psychology) [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Ketogenic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Low Glycaemic Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Total Elimination Diet - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Paleolithic Diet (Paleo) - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Specific Carbohydrate Diet [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other diets you would recommend for the treatment of Psychotic Disorders? (Please Specify)

44. How likely are you to recommend the following supplements for children presenting for treatment of a Psychotic Disorder?

- Vitamin B6 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin B12 - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Vitamin C - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Fish Oil - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Folate - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Magnesium - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Multivitamin - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Probiotics - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Zinc - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Are there any other supplements you would recommend for children presenting for the treatment of a Psychotic Disorder? (please specify)

45. How likely are you to recommend the elimination of the following from the diet of children presenting for the treatment of a Psychotic Disorder?

- Dairy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Casein- [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Corn - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Food Colourants - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Gluten - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Sugar - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Soy - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]
- Salicylates - [Would not Recommend; Very Unlikely; Somewhat Likely; Very Likely; Definitely Recommend]

Is there anything else you would recommend eliminating from the diet of a child presenting for treatment of a Psychotic Disorder? (please specify)

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**The NUTCOMP**

## Confidence in Nutrition Knowledge

46 Please rate how confident you are in your knowledge of...

*(Note, for this question the term "chronic disease/illness" is taken to include psychological disorders)*

- How different body systems are affected by foods and nutrients - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- How foods and nutrients influence the development and management of chronic disease and illness - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- How an individual's body composition (including size, shape, weight) can impact on the development of chronic disease and illness - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- The Australian Guide to Healthy Eating, including the recommended serves of food groups and serving sizes for different ages and genders - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Guidelines for the nutrition-related specific chronic diseases (including type 2 diabetes and cardiovascular disease) - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- How foods and nutrients interact with medications - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- The most recently published peer reviewed evidence regarding nutrition and chronic disease and illness. - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]

47. Please rate how confident you are in your ability to...

- Interpret Data about height, weight and body composition against reference ranges [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Interpret an individuals biological data (e.g. blood pressure, cholesterol levels) against reference ranges - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Collect information on the food that an individual usually eats (e.g. diet history, food frequency questionnaire) - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Use the Australian Guide to Healthy Eating to evaluate the appropriateness of an individual's food intake - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Determine appropriate food or nutrition goals for an individual with chronic disease/illness - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Formulate a meal plan for an individual with chronic disease or illness - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Recommend changes in food choices for an individual with chronic disease/illness - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Monitor and evaluate changes over time regarding the food an individual usually eats - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Maintain clear and concise records regarding nutrition related assessment and advice you provide to individuals - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Access the most recently published peer-reviewed evidence regarding nutrition and chronic disease/illness - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]



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- Provide nutrition care than results in improvements in the food that an individual usually eats [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]

-

48. Please rate how confident you are in your ability to...

- Clearly describe what patients/clients can expect from their discussions with you about food or nutrition - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Check a patient's/client's understanding of the influence of food and nutrients on their health Work with patients/clients to identify possible ways to improve the food they usually eat - - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Demonstrate genuine empathy to patients/clients about their food-related experiences and goals - - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Maintain a non-judgemental attitude in discussions with patients/clients about the food they eat - - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Communicate with clients about food and nutrition using culturally appropriate language - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Consider how personal, social, cultural, psychological, and economic factors may influence the foods that a patient/client eats - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Identify individuals who need additional support from other health professionals or services regarding the food they eat - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]
- Communicate with other health professionals about the discussions you've had with patients/clients regarding food - - [Not Confident at all; Not Very Confident; Somewhat Confident; Very Confident; Extremely Confident]

49. Please rate your agreement with the following statements:

*(Note, for this question the term "chronic disease/illness" is taken to include psychological disorders)*

- It is important that all individuals usually eat healthy foods regardless of age, body weight and physical activity levels - [Completely Disagree; Somewhat Disagree; Neither Agree or Disagree; Somewhat Agree; Completely Agree]
- If the topic arises, it is important that I encourage my patients/clients to eat healthy food - [Completely Disagree; Somewhat Disagree; Neither Agree or Disagree; Somewhat Agree; Completely Agree]
- It is important that I take every opportunity possible to encourage my patients/clients to eat healthy foods - [Completely Disagree; Somewhat Disagree; Neither Agree or Disagree; Somewhat Agree; Completely Agree]
- Encouraging my patients/clients to eat healthy foods is an effective use of my professional time - [Completely Disagree; Somewhat Disagree; Neither Agree or Disagree; Somewhat Agree; Completely Agree]
- Providing specific nutrition recommendations to my patients/clients that can assist with managing their chronic disease/illness is an effective use of my professional time. - [Completely Disagree; Somewhat Disagree; Neither Agree or Disagree; Somewhat Agree; Completely Agree]
- It is important that I encourage my patients/clients to seek support from other health professionals if I am unable to meet their nutrition-related need - [Completely Disagree; Somewhat Disagree; Neither Agree or Disagree; Somewhat Agree; Completely Agree]

**Appendix B - Description of Dietary Interventions**

Dietary Intervention	
Failsafe Diet	A dietary approach which attributes a plethora of physical and psychological symptoms to food intolerances. The diet promotes the avoidance of processed foods, preservatives, artificial colours, flavour enhancers and synthetic antioxidants, coupled with reducing salicylate intake (Dengrate, 2019 – fedup.com)
Gut and Psychology Diet (GAPS)	A derivative of the Specific Carbohydrate Diet, which seeks to restore beneficial gut bacteria to promote normal digestion and absorption of food, to avoid nutritional deficiencies. (Campbell-McBride, 2018). The diet comprises of a highly restrictive “introduction diet” followed by an extended period on the “Full GAPS diet” which involves the elimination of grains, pasteurised dairy, starch vegetables, refined carbohydrates and processed foods. The diet recommends the inclusion in fermented food and beverages such as yogurt, kefir and kombucha as well as regular consumption of broths and meat stocks (International Nutrition, n.d.)
The Ketogenic Diet	Involves entering into an initial fast to induce ketosis. This is followed by the introduction of a diet which is high in fat, contains adequate protein to maintain growth and limits carbohydrates (Wheless, 1995).
Low-GI	Low-GI diets restrict the intake of foods with a high glycaemic index, including certain vegetables, the majority of fruits and processed foods including refined starches and sugars (Katz & Meller, 2014).
Total Elimination Diet (TED)	Strictly speaking, the TED involves a diet of only an elemental or amino-acid based formula (Greenhawt et al. 2013). However, this term is also used to refer to other highly restrictive diets which involve consuming only the least allergenic foods from each of the food groups typically; turkey, lamb, potato, sweet potato, rice, millet, squash and pear (Crook, 1988).
Paleolithic (Paleo) Diet	A diet which emphasises the avoidance of processed foods and elimination of dairy and grains. This diet predominately involves the intake of vegetables, fruits, nuts, seeds eggs and lean meats (Katz & Meller, 2014)
Specific Carbohydrate Diet	A diet which is predicated on the view that under certain conditions, most carbohydrates and some proteins are unable to be completely digested. Within this diet, only carbohydrates which are “pre-digested” are allowed. Amongst other foodstuffs, the diet excludes grains, processed foods, starchy vegetables, sugar and dairy (with the exception of homemade fermented yoghurt) (Gotschall, 2004).

## Appendix C: The Australian Psychologist – Author Guidelines

### 1. SUBMISSION

Thank you for considering submitting to *Australian Psychologist*. By submitting your manuscript, you confirm it is not under publication consideration or has been published elsewhere. The exception is brief abstracts for scientific meetings.

Once your submission is prepared in accordance with our Guidelines, submit your manuscript at <http://mc.manuscriptcentral.com/apsych>

### 2. MANUSCRIPT TYPES AND WORD LENGTH

*Australian Psychologist* accepts new and continuing empirical reports (quantitative/qualitative/case study). Reports must be completed to a high standard and relevant to psychological practice, health policy, and journal readership. *Australian Psychologist* publishes commentaries and response to commentaries of articles appearing in the journal.

Submission word limits include all materials i.e. title page, manuscript, references, tables, and figures. i.e.

Quantitative reviews (8000 words)

Narrative reviews (5000 words)

Commentaries (6000 words)

Case Studies (4000 words)

### 3. STYLE

Manuscripts must follow the American Psychological Association's publication style guidelines (6th ed.), except regarding spelling. *Australian Psychologist* uses Australian spelling - please follow the latest edition of The Macquarie Dictionary (3rd ed. Rev.). All articles published by the journal are in English.

### 4. MANUSCRIPT REQUIREMENTS

The following relates to quantitative and/or qualitative research, and Case Studies. Hypothesis in this context relates to research questions and hypotheses.

#### Empirical Reports

Empirical Reports submitted to *Australian Psychologist* must adhere to

- (i) Journal Article Reporting Standards (JARS) guidelines for reporting psychological research reports and
- (ii) Meta-Analysis Reporting Standards (MARS) guidelines for reporting meta-analyses (i.e., Appendix of APA Publication Manual, <http://www.apastyle.org/manual/related/JARS-MARS.pdf>).

Consistent with the American Psychological Association (6th ed.) publication guidelines, JARS and MARS guidelines provide a data reporting standard to ensure readers have appropriate information to evaluate findings' importance. Authors describing other review methodologies should also comply with JARS and MARS guidelines wherever possible.

Manuscripts should be presented as:

separate title page

abstract and key words, text, key points, acknowledgments, references, appendices, endnotes, tables with title and footnotes, and figures.

Text footnotes are not allowed – please use endnotes.

Note for qualitative research, the method, results and discussion sections may differ from directions d), e), and f) below as specified in the section entitled Qualitative Research.

## DIETARY INTERVENTIONS FOR CHILDREN

a) **Title page:** Submissions are subject to anonymous peer review. Author details must not appear in your manuscript, but should appear in a separate Title Page containing (i) manuscript title (ii) running head ( 40 characters), and (iii) manuscript date. The title should be short, informative, contain the major key words and variables under investigation. Please do not use abbreviations in the title.

b) **Abstract:** *Australian Psychologist* manuscripts must include a 200 – 250 word abstract, structured to these headings: **Objective, Method, Results, and Conclusions**. Six key words for indexing should be placed after the abstract, in alphabetical order.

c) **Introduction:** *Australian Psychologist* will only accept manuscripts with data/research supporting the conceptual and theoretical positions. Please:

- outline the problem's importance, and theoretical and practical implications;
- provide a comprehensive, up-to-date literature review and critique using the best forms of evidence;
- state how present research differs from previous research;
- specify research aims, hypotheses or research questions;
- describe how theory was used to derive hypotheses or research questions; and how the research design and hypotheses relate.

d) **Method:** The method section of quantitative and qualitative reports must contain a detailed account of measures/procedures to ensure reader understanding/replication. The method should describe:

- the participant characteristics and any inclusion/exclusion criteria; demographic variables and any topic-specific characteristics;
- sampling procedures used for selecting participants, including information regarding the sampling method, percentage of sample approached that participated;
- where the data were collected (e.g., within the workplace, clinic, private practice, off-site setting e.g. independent office, via post, etc.);
- any conditional requirements for participation such as payment of participants, agreement to provide study results, entry into a prize raffle; informed consent;
- ethical approval statement; intended and actual sample size and power analyses used to determine sample size;
- all study instruments used, including those that are not being reported within the present study; interview transcripts, where relevant;
- whether parts of the database have been previously published or are being published separately; psychometric or biometric information on measures, where relevant; assignment method; and statistical analyses procedures.

*Australian Psychologist* retains the right to reject any manuscript on the basis of unethical conduct in research.

e) **Results:** For quantitative studies, *Australian Psychologist* requires adequate reporting of statistical significance of results. Please report means, standard deviations, and confidence intervals for all continuous study variables and the effect sizes for the primary study findings. If effect sizes are not available, please include this in your submission cover letter. Please report confidence intervals for any effect sizes involving principal outcomes.

This section should include participant flow (i.e., total number of participants, flow of participants through each stage of the study); recruitment, dates of the recruitment period and any repeated measures of follow-up assessments; all information regarding statistical analyses, including problems with assumptions or distributions that could affect findings

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validity, any missing data (including percentages or frequencies, theories regarding the cause of missing data and whether it is missing at random, and methods used to address missing data); information regarding cases deleted from any primary or secondary analysis, subgroup or cell sample sizes, means, standard deviations, and other descriptive statistics, and effect sizes and confidence intervals; information regarding the error rate adopted for inferential statistics and the direction, magnitude, degrees of freedom, and exact p level; variance-covariance matrix or matrices associated with multivariate analytic systems; estimation problems; the statistical software program used, information surrounding other analyses (e.g., exploratory analyses); and a discussion of implication of ancillary analyses for statistical error rates.

f) **Discussion:** For quantitative reports, this section requires a support or non-support statement for all hypotheses and how these were assessed (i.e., primary or secondary analyses, or post hoc explanations); similarities or differences between results and those in previous research; an interpretation of results accounting for any sources of bias and threats to validity, the imprecision of measures, the overall number of tests and the overlap among tests, and limitations or weaknesses of the study; generalisability of findings accounting for the target population and any contextual issues; and a discussion surrounding the implications for future research, programs, or policies. Please discuss study sample diversity and the generalisability of findings.

g) **Key Points:** Please include 6 key points: 3 Key Points for “what is already known about this topic” and 3 Key Points for “what this topic adds” in your manuscript. Please place the Key Points after the key words in the manuscript, and write your Key Points with a practitioner audience in mind.

i) **Acknowledgements:** The source of financial grants and other funding must be acknowledged, including a declaration of authors’ industrial links and affiliations. Colleague or institutions contributions should also be acknowledged. Personal thanks are not appropriate.

j) **References:** All referencing, footnotes, tables and figures must be prepared according to the Publication Manual of the American Psychological Association requirements (currently 6th ed.). This includes Digital Object Identifiers (DOI’s) wherever available.

k) **Endnotes** must appear as a numbered list at the end of the manuscript, not the foot of each page. Endnotes should be referred to with consecutive, superscript Arabic numerals in the text. They should be brief, containing short comments tangential to the paper’s main argument, and not include references.

l) Please place **Appendices** at the end of the manuscript, numbered in Roman numerals and referred to in the text.

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