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Co-creating Healthful Eating Behaviors with Very Young Children: The Impact of Information Overload on Primary Caregivers

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ABSTRACT: Primary caregivers of very young children are subject to excessive and often disparate information regarding the instilling of healthful eating behaviors. Our study focuses on the integration of the operant resources of primary caregivers' (i.e. their knowledge and modelling skills) and that of their very young children (i.e. their self-regulation of energy intake and food preferences) to co-create healthful eating behaviors as a measure to curb overweight and obesity in adulthood. Our two-stage qualitative study makes original contributions demonstrating that primary caregivers' efforts to co-create healthful eating behaviors with their very young children are adversely affected by information overload.

KEYWORDS: Very young children, co-creation, healthful eating behaviors, obesity

Introduction

Unhealthful eating behaviors have contributed to the rise in rates of overweight and obesity around the globe (National Health and Medical Research Council, 2013). Addressing and counteracting unhealthy eating behaviors in childhood is regarded as the most effective approach to curbing overweight and obesity in adulthood (World Health Organisation, 2015). Primary caregivers, in conjunction with their very young children, are the co-creators of children's health. Primary caregivers are critical to the success of healthful eating interventions (Summerbell, Moore, & O'Malley, 2014). Although there has been a recent proliferation of interventions to prevent childhood overweight and obesity there is a gap in the literature regarding primary caregivers' co-creation efforts and the role of information overload. Children under three years of age are in a critical stage for the development of

healthful eating behaviors, but research involving children in this age range is sparse (Summerbell et al., 2014). Also, whilst primary caregivers access various sources of information on nutrition and instilling healthful eating behaviors (Austin, Pinkleton, Radanielina-Hita, & Ran, 2015), its impact is not evident from the literature. Thus, our study had two research objectives. The first was to explore *how* and *why* primary caregivers co-create eating behaviors with their very young children; and the second, to explore how information overload impacts on the co-creation efforts of primary caregivers.

Overweight and Obesity

Overweight and obesity are amongst the most important public health problems facing the world today, burdening societies with premature mortality and morbidity (WHO, 2015). A focus on the role of primary caregivers in the prevention of overweight and obesity in very young children is critical (Summerbell et al., 2014). This is because unhealthy eating behaviors established in childhood are known to lead to overweight and obesity later in life (Fiorito, Marini, Francis, Smiciklas-Wright, & Birch, 2009). The majority of overweight and obesity prevention interventions have been targeted at older, school age children (e.g. Pedersen, Gronhoj, & Thogersen, 2015). Research addressing overweight or obesity in children younger than three years of age is scarce (Summerbell et al., 2014) although the genesis of overweight and obesity “occurs in the first years of life as feeding patterns, dietary habits, and parental feeding practices are established” (Dattilo et al., 2012, p. 1).

Primary Caregivers as Co-Creators of Healthful Eating Behaviors

Primary caregivers are those who have responsibility for the daily caring of the child/ren in the family (Family Assistance Office, 2010). Caregiving involves actions, deeds and efforts which are characteristics of services (Berry, 1980). Caregiving refers to being “in-

service” to another and as such, we turned to the services marketing literature in which the concept of value co-creation — whereby interactions occur that benefit all parties — features as a ubiquitous concept (Vargo & Lusch, 2004; 2008). Vargo and Lusch (2004; 2008) note that all parties possess operant resources and these are brought together and integrated in such a way as to create value for both parties. In our study, the value generated through co-creation is the health of the child and its continuation into adulthood.

The co-creator role of the primary caregivers is critical. Primary caregivers have the responsibility of instilling healthful eating behaviors in their very young children. Hesketh and Campbell’s (2010) review of research focusing on health interventions for children between birth and five years of age concluded that during these early childhood years, primary caregiver involvement is vital for lasting changes. Furthermore, Hesketh and Campbell (2010) identified that successful interventions were designed to impact on the primary caregivers’ knowledge and skills (i.e. their operant resources).

Very Young Children’s Operant Resources

Very young children have two primary operant resources: the self-regulation of energy intake and food preferences. First, self-regulation refers to the ability of the child to adjust their energy intake in response to internal hunger and satiety cues (Cross, Hallett, Ledoux, O’Conner, & Hughes, 2014). Children under five years have the ability to self-regulate energy intake (Eleni et al., 2015). However evidence further indicates that this ability is diminishing as early as two years of age (Fox, Reidy, Novak, & Zeigler, 2006).

Nonetheless, it is a common desire of primary caregivers that their young children eat what they would define as “enough”, which means that the quantity eaten is that determined by the primary caregiver (Moore, Tapper, & Murphy, 2007) and may be more than is nutritionally necessary. Deliberately increasing the amount of food put on plates and playing games with

foods are typical strategies used by primary caregivers (Pagnini, Wilkenfeld, King, Booth, & Booth, 2007) to increase the quantity eaten by very young children.

The second operant resource of very young children is their food preference. Food preference is a major determinant of food intake (Drewnowski, 1997) and very young children's preferences influence foods made available to children (Campbell, Crawford, & Hesketh, 2006). Food preferences that develop in childhood are reflected in food choices made later in life (Nicklaus, Boggio, Chabanet, & Issanchou, 2004) and establishing a preference for healthful food in childhood is paramount to establishing long term healthful eating behaviors (Cooke & Wardle, 2005).

A complex interplay of physiological and environmental factors shape children's food preferences (Dovey, Staples, Gibson, & Halford, 2008), but very young children learn to like the foods given to them (Harris, 1993). It is recommended that solid foods be introduced around six months, to complement breastfeeding (NHMRC, 2013). Also relevant is that from the age of 14 months, new foods tend to be tried by children only if adults are seen to be eating them rather than if they are just offered to the child (Harper & Sanders, 1975). It is recommended that various core foods (e.g. fruits, vegetables, grains, meats, dairy products) are introduced. Core foods are defined as those consumed in appropriate proportions in order to promote health in both the short-term and long-term (NHMRC, 2013). Non-core foods are those with high fat, sugar and salt that deliver fewer nutrients (NHMRC, 2013).

Primary Caregivers' Operant Resources

Primary caregivers should have two complementary operant resources: modelling of healthful eating behaviors and a detailed knowledge of healthful eating behaviors. Modelling is a basic component of the process of children learning to eat. It is usually the case that, when in the presence of others, children eat more (de Castro & Brewer, 1992), and new foods

are more quickly accepted (Addressi, Galloway, Visalberghi, & Birch, 2005). Natale et al. (2014) and Brown, Scragg and Quigley (2008) concluded that eating core foods as modelled by primary caregivers is positively associated with the eating of core foods by children. Also, modelling by primary caregivers is more influential than modelling by teachers (Natale et al., 2014), the effect of advertising (Bolton, 1983), verbal prompts to eat (Harper & Sanders, 1975), and dietary control (Brown & Ogden, 2004).

Primary caregivers' knowledge of healthful eating behaviors is their second operant resource. Charged with the important task of instilling healthful eating behaviors in very young children, primary caregivers are overloaded with information about food and nutrition. Information overload impacts on the speed of decision making and decision quality (Gross, 1964; Toffler, 1970). As such, the context of this study is different to the typical asymmetric transfer of information apparent in other health situations, namely the doctor-patient relationship (Barile, Saviano, & Polese, 2014). Indeed, many primary caregivers find themselves unable to effectively integrate the volumes of information.

Sources of knowledge for primary caregivers on instilling healthful eating behaviors are many and varied. Formal standards for healthful eating emanate from highly credible sources including the Australian Dietary Guidelines (NHMRC, 2013). Other information sources, however, communicate messages more clearly, improving uptake of new knowledge and skills. For example, the US "Bright Futures" initiative convey Satter's (1990) "division of responsibility" message, whereby the parent provides healthful foods and the child decides on the quantity to be eaten. This is presented as an unambiguous principle. Conversely, the Australian government publications detail the quantities of foods from each food group recommended for consumption at varying ages. Undermining these recommendations is a growing skepticism around healthful eating information provided by the government, with a view that it is potentially biased (Hart, Herriot, Bishop, & Truby, 2003).

Aside from the numerous websites and books that provide primary caregivers with information, medical practitioners and child health nurses are also key messengers (Barile et al., 2014). Irrespective of the credibility of health professionals, it has been found that friends and family are significant sources of information for primary caregivers' when making decisions about healthful eating (Abbott, 1997).

The Impacts of Information Overload on Primary Caregivers' Operant Resources

Information overload has increased with the advancement of technology in healthcare information seeking (Dutta-Bergman, 2004; Della, Eroglu, Bernhardt, Edgerton, & Nall, 2008) particularly via social media (Korda & Itani, 2013). Information overload is essentially where the quantity of information exceeds an individual's capacity to cognitively process the data, negatively impacting decision making and decision quality (Gross, 1964).

Misinformation is also a likely consequence when information is not well-organized and assessed for validity and reliability, such as determining the credibility of the source of information (Flew, 2008). A further negative consequence of information overload is "information anxiety" which when applied to the context of our study, is where a primary caregiver perceives a gap between the information they have on instilling healthful eating behaviors and the information that they think that they must understand to "do it right" (Kovach, 2010). Thus, primary caregivers often self-curate volumes of information from the various personal and professional sources and such variability in information sees credible and proven messages contaminated with inaccurate information; a phenomena referred to as information pollution (Kovach, 2010).

The diversity and abundance of nutrition information accessed by primary caregivers has been previously identified by Hart et al. (2003), however its impact has not been explored; information overload has not been previously related to the feeding practices

employed by well-intentioned primary caregivers of very young children. Empirical studies have shown that feeding practices, such as pressuring a child to eat, do not work in helping children to develop ‘good’ eating habits; yet these practices remain commonplace (Ogden, Reynolds, & Smith, 2006). Conversely, empirical studies have found that the modelling of healthful eating behaviors by primary caregivers is particularly effective (Natale et al., 2014) yet rarely promoted and used (Gregory, Paxton, & Brozovic, 2010).

Methodology

Given the dearth of empirical studies in the area, a two-stage qualitative methodology was most apt. In accordance with the “fact and theory” approach (Berg, 2004), our study commenced with pure induction (theory building) in Stage 1, followed by deduction (theory testing) in Stage 2. Our multiple case study – conducted on the Sunshine Coast, Queensland, Australia – design provided theoretical replication and literal replication (Yin, 1994; 2009).

Stage 1 study followed the Dick (1990) convergent interviewing method and comprised 16 interviews with primary caregivers of children aged one to five years and resulted in a total of 341 pages of transcripts. Convergent interviewing was selected primarily for its usefulness in exploring areas that lack a theoretical base (Rao & Perry, 2003) as is the situation not only with primary caregivers’ attitudes and behaviors regarding very young children’s eating behaviors but also for identification of key themes.

Stage 1 informed Stage 2 in ways beneficial to addressing gaps in the literature. First, in Stage 2 exploration of the role of primary caregivers as co-creators of the eating behaviors of their very young children was enabled by the selection of participants whose children were in a younger, narrower age range (12 months to 30 months of age). This age range was also more appropriate for the study of the modelling of healthful eating behaviors (Reilly et al., 2005) and would result in more specific and comparable data.

Second, Stage 1 further highlighted the gap in the literature when answers to the question “*Why* do primary caregivers behave the way they do?” were analyzed. The case study approach was deemed appropriate for Stage 2 and Social Cognitive Theory was identified as a relevant theory to be used to develop the theoretical framework and identify the research issues. More importantly was the emergence from Stage 1 of the theme of diversity and abundance of information influencing primary caregivers in their role of co-creation of their very young children’s eating behaviors.

Stage 2 was our principal study and the focus of this paper. Stage 2 comprised 24 interviews with primary caregivers with each family unit classified as a case with one or two participants (primary caregiver alone or with partner). One in-depth interview per case was conducted. Stage 2 employed Yin’s (1994) case study methodology to compare and contrast findings made with that in the literature and and/or the inductive Stage 1 findings.

Prior literature contributed in several ways to the research. The literature review informed the research concerning the influences of primary caregivers on very young children’s eating behaviors by presenting the areas of research interest and the extent of research undertaken to date. The plethora of studies regarding interventions into prevention of childhood overweight and obesity and primary caregivers’ behaviors including feeding practices (Hesketh & Campbell, 2010) and modelling (Natale et al., 2014) was evident. In contrast, the paucity of studies addressing *why* primary caregivers conduct these behaviors was also evident, as was the few studies involving very young children. Prior literature also provides background research regarding self-regulation of energy intake (Birch & Deysler, 1986) and development of food preferences (the operant resources of very young children) (Nicklaus, Boggio, Chabanet, & Issanchou, 2004). Relevant to this study, prior theory identified two gaps in the literature: i) the need for qualitative research addressing *how* and

why primary caregivers co-create their very young children's eating behaviors; and ii) how information overload impacts on the co-creation efforts of primary caregivers.

For Stage 2, we sought diversity among our case families in terms of socioeconomic status, family configuration, and employment status of the primary caregiver. Cases were recruited from two diverse socioeconomic regions based upon the Australian Bureau of Statistics (2009) Socio-Economic Indexes for Areas (SEIFA) scores related to medical centers and child care centers. Recruitment notices, in the form of flyers and posters, were displayed in the various centers, requesting potential participants to contact the researcher via email or telephone. Upon contact, participants were provided general information regarding the purpose of the research as well as information regarding privacy, informed consent and the recording of the interviews as well as organization of an interview at a time and place convenient to the interviewee. A total of 29 potential participants made contact with the researcher but five were excluded due to ineligibility due to not having the child meeting the age criteria (n=2) or unavailability during the interviewing period (n=3).

In Stage 2 (Table 1), the majority of interviews involved one participant, all of which were female, except one. Participants were between 24 years and 44 years of age with 11 from a higher socioeconomic region and 13 from a lower socio-economic region. Many worked part-time outside of the home and had a partner in the home. There were 13 female and 11 male case children who were an average age of 21 months.

INSERT TABLE 1 ABOUT HERE

To address and minimize the potential for respondent bias a number of preventative measures were incorporated into the recruitment, interviewing and analysis stages of the research design. In terms of recruitment, a call for participants was framed to appeal to primary caregivers having "difficulties" regarding feeding their very young children. The interviewer presented herself as a researcher. Her background as a qualified, practicing

dietician with 20 years of experience while not concealed, was not promoted so as to be seen as non-threatening. An interview guide was developed featuring indirect questioning and a projective technique, whereby participants described a scenario represented by a drawing. Furthermore, the interviewer built rapport and did not rush interviews.

When analyzing the data, multiple sources of evidence were triangulated. All combinations of three pieces of evidence (including observations, notes, and the outcomes of a projective technique) and within-case analysis was conducted. Data often presented conflicting attitudes or behaviors of primary caregivers. The professional experience of the interviewer was pertinent to the process of within-case analysis with regard to determining attributes including: a) the healthful eating behaviors of the primary caregiver; b) the healthful eating behaviors of the case child; and c) whether the primary caregiver or the very young child determined the quantity of core foods eaten by the child. As an example of within-case analysis, a participant may claim not to use food as a bribe or reward. However, during the projective technique this method of persuading children to eat certain foods was revealed. Interviews ranged from 50-90 minutes with a total of 612 pages of transcribed data resulting. Assessments recommended by Lincoln and Guba (1985), Miles and Huberman (1994) and Yin (1994), such as the providing transcripts of the interviews to participants for checking, found the data to be valid and reliable.

Analysis of data was carried out according to the recommendations of Eisenhardt (1991), Miles and Huberman (1994) and Yin (1994) which emphasize the importance of cross-case analysis. Processes utilized were *a priori* specification of constructs, population specification, flexible instrumentation, cross case analysis tactics and uses of literature (Eisenhardt, 1991). Analysis was aided by the use of NVivo 8 software. The interview transcripts were initially coded by response to interview questions; other data were coded into detailed categories and associated categories were then merged into themes. Within-case

analysis was conducted as described above. Cross-case analysis was conducted using the variables from the data to identify patterns, similarities and differences between the cases as suggested by Eisenhardt (1989) and Yin (1994). Cross-case analysis was conducted initially among the attributes determined from with-in case analysis with other general attributes drawn from primary caregiver comments that emerged in the interviews. As qualitative research, anthropometric or dietary intake measurements were not collected from primary caregivers or very young children.

Research Objective 1 Findings

Research Objective 1 sought to explore how and why primary caregivers co-create very young children's eating behaviors. Our first major finding was that our study confirmed that primary caregivers are the co-creators of their very young children's health, acknowledging that they act "*for*" their children, in both the short-term (childhood) and the long-term (adulthood). Primary caregivers both want and need clear and steadfast short-term and a long-term goal for instilling healthful and life-long eating habits in their very young children. We found that the predominant short-term aim of primary caregivers is for the very young children to eat a quantity of food without careful consideration of what is healthful and unhealthful. For example, Karley noted: "*I've been trying not to just keep offering her things, especially bad things. I want her to eat something. I want to see her eating. She must eat.*"

While some primary caregivers allow the child to determine the quantity of food to be eaten, some do not and they act with conviction as exemplified by Savannah:

We've always said, 'That's not enough.' If Jane comes to me with her sausages and potato and says 'I've had enough' and she's only had two spoonful's and I'll say 'No you haven't.' So she comes back and normally finishes it.

When eating “enough” as determined by the primary caregiver is a key objective, the use of food as bribes and rewards are often involved. Lindy explained, *“If he says ‘Have I had enough to have ice cream?’ I’ll [say] ‘four more bites’.”*

As Worobey, Islas Lopez and Hoffman (2009) and Galloway, Fiorito, Francis, Lee and Birch (2006) identified, such ineffective feeding practices have adverse short-term and longer-term effects on very young children’s operant resources – being their self-regulation of energy intake and preference for core foods. We also found that primary caregivers are faced with daily challenges in their co-creation endeavors from others which impact on their short-term efforts. As Theresa said:

I think there’s this great pressure on women in society generally, to be absolutely Wonder Woman and say [to others that] your kid will have the five food groups today, [go to] soccer training, and do their homework. There’s huge pressure. Anyway, something’s got to give and so sometimes it might be that we’ll just have chicken nuggets and chips.

The conflict between primary caregivers regarding their concerns about overweight and obesity and their drive for the child to eat a greater quantity of food was evident. Primary caregivers were confronted by this dilemma each day and this led to ineffective feeding practices, such as using bribes. The sentiment expressed was that “something is better than nothing” and while there were some short-term consequences (such as child misbehavior resulting from a sugary treat used as a bribe), the long-term implications (such as overweight and obesity) tended to go unrecognized. As Kelsie conveyed, *“I was more than happy for him to have dessert there ‘cos it was once a week....and I didn’t have a problem with it, but at 10 o’clock at night I was still trying to get him to bed.”*

Long-term objectives regarding healthful eating behaviors were also investigated. Importantly, we found that there were two general long-term objectives; one centered on the

children's future health and the other on the children's social acceptability by peers. Those primary caregivers whose main objective was in the latter, social acceptability of their child, frequently fed unhealthful foods to their very young children. We note that these long-term objectives – future health and social acceptability – were not necessarily mutually exclusive. As such, primary caregivers may seek both long-term objectives and that these long-term objectives may both occur over time. Nonetheless, bringing these long-term objectives and how they influence the short-term feeding practices used to the attention of primary caregivers was seen to be an overweight and obesity preventative initiative; one that is not apparent in the existing bodies of literature.

Regarding Research Objective 1, our first major finding aligned with Bandura's (2004) Social Cognitive Theory that short-term, proximal objectives were more salient than long-term, distal objectives. Both short- and long-term objectives, however, were important to the instilling of life-time healthful eating behaviors. Thus, we concluded that there was a need for clear short-term guiding principles that were consistent with a long-term health goal built around child and primary caregiver operant resources.

Our second major finding for Research Objective 1 was that despite a high level of awareness regarding what modelling is and its effectiveness, primary caregivers engaged in the modelling of eating core foods to varying extents. In line with Wind et al. (2006), analysis of our data revealed an association between the primary caregivers' eating behaviors and that of the very young children in their care. However, what we found in addition to the extant literature was that primary caregivers "*put their child first*" in that they attempt to instill healthful eating habits even though they themselves did not actively subscribe to healthful eating behaviors. Primary caregivers portrayed this contradiction in two ways: it was the "*right thing to do*" for the young child and secondly, as a reasoning of their unhealthful eating behaviors. As an indicative quote, Sally described her situation:

[I tell my children] ‘...you’ve got to eat your vegies’ and in saying that, I don’t eat a lot of it because you know why? I’m feeding the girls all the time. I don’t feed myself. And if do, I feed myself something, five seconds, a handful of biscuits.

Our study also revealed that some primary caregivers, in their effort to ensure that their child eats enough food, adapt their own diets to suit the preferences of their very young children. This circumvents the modelling process. As Kat explained, “We used to live on curries. I don’t ever cook it any more ... yeah, he’s not into spicy, that is something that he won’t eat, spicy, hot foods; he doesn’t enjoy it, anyway.”

Research Objective 2 Findings

Research Objective 2 was to explore how information overload impacts on the co-creation efforts of primary caregivers. Our first major finding was that information regarding the instilling of healthful eating comes from many sources, with ‘significant others’ highly influential messengers. ‘Significant others’ are those seen by our participants to be the primary caregivers’ partners, their parents (i.e. young child’s grandparents), and other primary caregivers which whom they associate (e.g. “Mum’s groups”). We found that the partners impact on very young children’s eating behaviors directly but also through the primary caregiver. Primary caregivers in our study stated that they perceived the influence of their partners as generally detrimental to their child’s eating behaviors. For example, partners tended to have unhealthy eating behaviors and were less strict with non-core foods.

Another group of influential messengers are the parents of primary caregivers, identified by our participants as being unhelpful because they possessed outdated nutritional knowledge, rebuking guidelines and pressuring the primary caregiver to provide “treats” for the child. Similar sentiments were expressed when our participants discussed interactions with other primary caregivers. We found that encouragement from other primary caregivers

was more likely to be given to oppose recommendations made by authorities than to support these recommendations. We also found that primary caregivers, not wanting to be seen as “too strict”, would not directly address the unhealthful practices of other primary caregivers, thus not sharing their knowledge and skills. As Heather explained:

My friends I guess are similar to me, like we might complain about what other people let their kids have, like – one of my really good friends – her other friend lets her kids walk around – their babies walk around with bottles full of juice, or milk, sucking on them all day long and lollies and yeah, people do complain about it and whinge about it to each other, I guess you wouldn't say it outright [to them], like “You're doing the wrong thing!”

Our second major research finding revealed that primary caregivers are inundated with information and advice, often erroneous, regarding the instilling of healthful eating behaviors. These messages are from a range of sources of varying degrees of credibility and changed over time. As Raelene expressed, “*So what's right? What's wrong? Who determines what? I don't know, you get all these 'bits' from everybody and try and do the best you can!*”

We found that information overload was interfering with decision making by the primary caregiver, confusing and creating anxiety and resulting in: i) ineffective practices (e.g. using bribes); ii) paradoxical pursuits (e.g. wanting the child to eat more but concerned about the child becoming overweight or obese); iii) daily dilemmas regarding healthful eating behaviors in absence of short-term principles (e.g. food preference); and iv) an under-appreciation of long-term consequences (e.g. overweight and obesity).

National guidelines of various countries are a key source of information for primary caregivers, but this information varies by country and changes over time, with primary caregivers becoming increasingly skeptical of and confused by the information given. The specific prescription of amounts of foods recommended to be eaten by children at various

ages is a source of confusion for primary caregivers and is contrary to young children's capacity to self-regulate energy intake. Similarly, the incorporation of discretionary allowances of non-core foods in other guidelines seems to endorse their inclusion in very young children's diets. Significant others, particularly grandparents, are another potential source of both influential information and misinformation due to changes in guidelines over time. Collectively, information overload and incongruence are barriers to primary caregivers instilling healthful eating behaviors in their very young children. With so many messages and messengers, we found that the likely result was confusion, with unsuccessful attempts to integrate the information leading to skepticism and inertia, as Heather expressed:

When mums get together they're constantly talking about what the kids are eating and it gets very boring after a while – about their, you know, 'little Jimmy won't eat this', and you know, everyone's talking about their kids and yeah they do all the time, and you sort of get over it after a while.

Discussion and Implications

Our study addressed a number of known gaps in the literature and makes a number of novel theoretical contributions. Importantly, the findings of our study also lend themselves to practical solutions that are both useful and meaningful. Regarding Research Objective 1, we found that primary caregivers recognize that they are the co-creators of their young children's health and we recommend the drawing up of clear and steadfast short-term guiding principles. These should be centered on operant resources and are consistent with primary caregivers' long-term goal for their children's health. Such short-term guiding principles will address, for example, primary caregivers perceived expectation of their co-creation role to ensure that their young child eats "enough" food (whereby the quantity is determined by them) which impacts on the child's self-regulation of energy intake, leading to longer-term

consequences. Drawing from our study, and cognizant of the operant resources of both very young children and primary caregivers, we propose three short-term guiding principles.

Principle 1: Very young children self-regulate their energy consumption and recognize satiety; *Principle 2:* Very young children prefer core foods; and *Principle 3:* Primary caregivers' modelling of appropriate responses to satiety and preference for core foods surpasses all other approaches to instilling healthful eating in very young children.

These short-term guiding principles, should be presented as one message delivered "downstream" to primary caregivers by one credible messenger, namely the government's relevant health body. Supplemented with associated background education, the three short-term guiding principles would enhance primary caregivers' operant resources (i.e. their knowledge and modelling skills). There is also opportunity among the education material to identify opportunities and modes of modelling (e.g. eating together, attitudes expressed while eating) and also promotion of Satter's (1990) "parent provides, child decides" framework which endorses the child's capacity to self-regulate energy consumption.

A complementary long-term goal is equally important for lifelong health. Specifically, we note the disconnection between short-term, proximal action (e.g. unhealthful eating behaviors) and i) short-term, proximal consequences (e.g. child misbehavior) and ii) long-term, distal consequences (e.g. overweight and obesity in adulthood). Informed with additional, targeted knowledge (such as children's capacity for food preferences track into adulthood potentially leading to sub-optimal health) primary caregivers are likely to review and modify their practices. We also suggest the development of activities that bring about an increasing consciousness among primary caregivers of their long-term, distal goal for their children and how this may be influencing their present-day daily eating decisions. Activities that encourage primary caregivers to challenge themselves and to self-monitor their long-term goal would be advantageous especially if it is established that the long-term, distal goal

is lifelong health for the child, as opposed to social acceptability. Commitment to the long-term, distal goal may then guide the development of primary caregivers' knowledge and skill operant resources, framing their day-to-day health co-creation efforts.

In terms of Research Objective 2, the impacts of information overload, we found that significant others are particularly influential messengers. The implication of this finding is that education targeted "midstream" at significant others would complement the aforementioned "downstream" strategies. For example, conveying to primary caregivers' parents that nutrition priorities have changed over recent generations and that their cooperation towards their children's efforts is valuable for their grandchildren's health might be considered. Similarly, encouraging primary caregivers to actively share credible knowledge and skills with other primary caregivers who are engaging in unhealthy feeding practices; or to avoid supporting other primary caregivers' opposition to guidelines from credible authorities may be the focus of a "downstream" strategy.

Overall, we found that currently fundamental principles regarding the operant resources of the child and of the primary caregiver are relatively ignored. Under the quantum of messages primary caregivers become confused and in some cases disinterested and even reject the advice of credible authorities – all results of information overload. A convergence of messages around steadfast short-term guiding principles and a clear long-term goal directed in both "downstream" and "midstream", we believe, will enhance primary caregivers decision making and decision quality, and ultimately assist them in the effective co-creation of health in their very young children by instilling healthful eating behaviors.

Like all research, our study is subject to limitations which impact upon the generalizability of the findings. There are opportunities to extend our cross-sectional, exploratory, qualitative study to other regions using a longitudinal, quantitative approach to collecting data from multiple stakeholders such as significant others. Exploration of

information pollution regarding the instilling of healthful eating would be useful, as too would be a nuanced, potentially quantitative exploration of the relative importance primary caregivers organization or ranking of the sources (i.e. messengers) and content (i.e. messages) they are exposed to regarding the instilling of healthful eating in young children. In particular, testing our short-term and long-term principles is strongly encouraged.

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Table 1: Main Study Participants

Case#	Interviews	Primary caregiver					Child	
		No. of Interviewees	Age (yrs)	Gender	Education Level*	Employment**	Partner Present	Age (months)
HIGH SOCIOECONOMIC AREA-SEIFA^ SCORE 1070								
Candice	1	32	Female	R	NH (PT)	FT	19	Male
Don	1	39	Male	NR	NH (FT)	FT	27	Male
Helga	1	34	Female	<incl Yr12	NW	FT	22	Male
Heather	1	44	Female	R	NW	FT	27	Male
Jinny	2	41	Female	R	NW	FT	26	Female
Leslie	1	37	Female	NR	NH (PT)	FT	17	Male
Lillian	1	25	Female	NR	NH (PT)	FT	18	Female
Raven	2	30	Female	<incl Yr12	NH (PT)	PT	27	Female
Raelene	1	39	Female	<incl Yr12	NH (PT)	FT	27	Female
Reanna	1	33	Female	NR	NH (PT)	FT	16	Male
Sally	1	33	Female	NR	H (PT)	FT	12	Female
Average	1	35					22	5/11 F
LOW SOCIOECONOMIC AREA-SEIFA^ SCORE 888								
Andrea	1	34	Female	R	NH (PT)	FT	29	Male
Jacki	1	31	Female	NR	H (PT)	FT	13	Male
Jeannie	1	36	Female	NR	NW	FT	23	Male
Karly	1	38	Female	NR	H (PT)	None	17	Female
Kate	1	40	Female	NR	NH (PT)	FT	12	Female
Kelsie	1	33	Female	R	NW	FT	14	Male
Kerry	1	27	Female	R	NH (PT)	FT	24	Female
Lindy	1	36	Female	NR	NW	None	26	Female
Nita	2	24	Female	NR	NW	FT	28	Female
Regina	1	29	Female	<incl Yr12	NH (PT)	FT	13	Female
Savanna	1	24	Female	<incl Yr12	NH (FT)	FT	20	Female
Tania	1	28	Female	NR	NW	None	18	Female
Teresa	1	33	Female	NR	H (PT)	FT	26	Male
Average		32					20	8/13 F

Note: # Names of participants have been changed to protect their identity; ^SEIFA(Socio-Economic Indexes for Areas) Scores used to indicate socio-economic status in this research; *Education level-<incl Yr12 (up to and including Year 12); R(tertiary education considered relevant included Bachelor Degrees in Human Services (Mother, Child and Family), Special Education, Early Childhood, Education, Nursing, Science (Food Science and Technology) and other recognized Child Care training); NR(tertiary education considered not relevant included Honors or Bachelor Degrees in Arts, English, Business Administration, Social Work, Adult Education and Training, Financial Planning, Business, Marketing and Marine Science and Diploma or Certificate 3 level training in Journalism, Office Administration and Nursing); ** working status-not working (NW), working from home, part time (H (PT)), working away from the home, part time (NH (PT)) or full-time (NH(FT))