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Pre-sliced or do it yourself? – Determinants of schoolchildren's acceptance of convenience fruits and vegetables



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ABSTRACT

Previous research shows that the method of preparation can significantly influence children's fruit and vegetable (F&V) acceptance. The purpose of this study was to analyze the determinants of children's liking of industrial pre-sliced and single packed F&V within the framework of the European Union School Fruit Scheme (SFS). In addition, the influence of the liking of pre-sliced F&V on the choice for pre-sliced vs. non-pre-sliced F&V was determined. A baseline survey was conducted with 118 schoolchildren (aged 8–10 years) receiving normal F&V in the framework of the SFS and involved the preparation and characteristics of F&V. After the intervention group ($n = 60$) received pre-sliced F&V for 6 weeks, the survey was conducted again with complementary questions concerning pre-sliced F&V, and the results were compared with those of a control group ($n = 58$) that continued to receive non-pre-sliced F&V. The survey results indicated that the liking of F&V significantly decreased in the intervention group, while it remained constant in the control group. Multiple regression analyses indicated that the sensory deficits and negative packaging characteristics of pre-sliced F&V significantly and negatively influenced the rating for pre-sliced F&V, while savings in effort and time for preparation positively influenced the liking. Furthermore, the liking of pre-sliced F&V significantly and positively influenced the choice for pre-sliced F&V. In contrast, a positive attitude towards F&V preparation negatively influenced the choice of pre-sliced F&V. Based on the results, the general distribution of pre-sliced F&V cannot be recommended in the framework of school-based F&V intervention programs.

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1. Introduction

There is a general consensus in the scientific literature that appropriate fruit and vegetable (F&V) consumption can lower the risks of chronic diseases (Buijsse et al., 2009), and F&V consumption during childhood is a significant positive predictor of F&V intake in later life (Baxter & Thompson, 2002; Krebs-Smith et al., 1995). However, children's daily F&V consumption falls considerably below the recommended minimum intake of 5 servings (WHO., 2003). In Germany, 70% of children eat <2 servings per day (Mensink, Heseke, Richter, Stahl, & Vohmann, 2007). As a reaction, a counter-movement can be observed in Western industrial nations regarding sustainable procurement, with some discussion of a "school food revolution" (Morgan & Sonnino, 2008). The topic has also recently been on the public agenda (National Restaurant Association., 2013). One major aim within this

movement is the promotion of a healthy diet in general and a higher proportion of intake as F&V, in particular.

1.1. School-based interventions

Interventions in schools are seen as an effective instrument for improving the F&V intake of children (Howerton et al., 2007; Potter et al., 2011), and the European Commission (EU) Agriculture Ministers agreed in November 2008 to introduce an EU School Fruit Scheme (SFS) to promote the consumption of F&V among European school children. In North Rhine-Westphalia (NRW), the largest federal state in Germany, the SFS has been in operation since March 2010. Starting with 355 primary and special needs schools, the uptake of the scheme has been growing steadily, with >1000 enrolled schools in the 2014/15 academic year (European Commission & MKULNV, 2012; MKULNV, 2012). In the SFS, which is financed by the EU and the federal state, every child receives 100 g of F&V per day 3 days per week. An initial evaluation of the SFS in NRW revealed a positive impact on children's F&V intake (Wingensiefen, Maschkowski, Höllmer, Simons, & Hartmann, 2012).

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The implementation between different programs as well as within each program varies considerably. Although the SFS defines a concrete framework with respect to the amount of F&V provided and the need for accompanying educational measures, the operational implementation of the preparation process is decided by the schools themselves. The basic idea was an early and intensive integration of children, as the target group, in the preparation and distribution process, which has been implemented in many schools in an exemplary fashion. Such preparation and distribution tasks may be performed by children autonomously or with the help of parents. However, this implementation can be costly, time-consuming, and labor-intensive as well as requiring organization and storage and preparation facilities, which are often not realistic for public institutions (Baranowski et al., 2000; Bauer, Yang, & Austin, 2004; Burchett, 2003; Hendy, Williams, & Camise, 2005; Horne, Lowe, Fleming, & Dowey, 1995; Lytle & Achterberg, 1995; Perry et al., 1998; Reynolds et al., 2000). As a result of these barriers, schools must adjust to their specific situation; the easiest but least favorable solution is to not apply for or phase out SFS participation (Wingensiefen et al., 2012). In addition, a change to fruit substitutes, such as juice, can be a disadvantage from a nutrition and physiological standpoint (Alexy, Sichert-Hellert, Kersting, Manz, & Schöch, 1999; Dennison, 1996; O'Neil & Nicklas, 2008). Another solution is to stop the involvement of the children in the preparation process. In these cases, school staff or parents often slice the fruit and vegetables. However, this does not eliminate all of the potential problems and can result in difficulties finding volunteers. In the end, the teachers become responsible, which may result in reluctant participants (Hendy et al., 2005). A solution that takes this one step further is the purchase of ready-to-eat, cut, fresh F&V. This process has rarely been tested in practice within the SFS framework in Germany. Therefore, it is unknown how this change in the distribution process affects children's liking of F&V, which is of fundamental importance because the liking of F&V is an important factor for their choice and intake (Baxter & Thompson, 2002; Birch, 1979; Domel et al., 1993; Howard, Mallan, Byrne, Magarey, & Daniels, 2012).

The boundaries between liking, preference, and acceptance are blurred, and the measurement of these factors depends on whether the definition is restricted to taste or a more sophisticated understanding of the terms from a more hedonic approach such as cognition (Birch, 1979; Cardello, Schutz, Snow, & Leshner, 2000; Domel et al., 1993; Garcia-Burgos & Zamora, 2015; Hendy et al., 2005; Meiselman, Johnson, Reeve, & Crouch, 2000; Mielby, Kildegaard, Gabrielsen, Edelenbos, & Thybo, 2012; Thybo, Kühn, & Martens, 2004; Vereecken, Vandervorst, Nicklas, Covents, & Maes, 2010). F&V acceptance is described in the literature as an interaction between liking/preference and choice/consumption (Hendy et al., 2005). Recent research shows that the method of preparation can influence children's liking and preference and, thus, acceptance of F&V (Burchett, 2003; Zeinstra, Koelen, Kok, & de Graaf, 2010). Therefore, the implementation and preparation method may indirectly influence the success of school F&V intervention programs. To analyze F&V acceptance, the determinants for the liking of pre-sliced F&V is of particular interest as well as the effect of a change from normal to pre-sliced F&V on liking.

1.2. The convenience approach in the scientific literature

From a theoretical perspective, convenience can be defined in terms of the savings in time, physical energy, and mental effort for the consumer in food-related activities (Buckley, Cowan, & McCarthy, 2007). Two theoretical frameworks have been dominant in explaining convenience consumption (Scholderer & Grunert, 2005). The first relies on Becker's (1965) theory regarding the allocation of time within a household (Candel, 2001), which focuses on

the time associated with preparing and eating food and the labor-saving perspective of convenience (Jaeger & Cardello, 2007), which is a recurring element in the convenience literature. Although research on food convenience has typically focused on food prepared at home or served in restaurants, convenience is also of critical importance to institutional-based food preparation (Jaeger & Cardello, 2007). However, empirical studies have revealed that not only economic variables alone (e.g., opportunity costs of time) but also differences in taste and attitudinal variables influence consumption of convenience foods. These variables are central to the second theoretical framework, namely the convenience orientation approach by Yale and Venkatesh (1986); this framework extended the resource constraints perspective by several factors determining consumers' choice of convenience products, including the appropriateness of a product and the social and cultural aspects. Although it is widely agreed that convenience is a complex and multidimensional construct (Berry, Seiders, & Grewal, 2002; Darian & Cohen, 1995; Gehrt & Yale, 1993; Gofton, 1995; Jaeger & Cardello, 2007), Jaeger and Cardello (2007) indicated that a consensus on the different elements of that construct has not yet emerged. However, there is broad agreement that effort and time contribute to the concept of convenience. Furthermore, a more complete conceptualization of the convenience construct appears to be emerging. Current scientific tendencies consider a holistic consumption process perspective including the specific case-related attributes necessary to make an activity or product more convenient. However, empirical studies testing this framework are, as yet, scarce (Clulow & Reimers, 2009; Jaeger & Cardello, 2007; Scholderer & Grunert, 2005; Seiders, Voss, Godfrey, & Grewal, 2007).

Although there is no theoretical framework that describes the liking and preference of convenience appropriately for the objective of this study, several of the mentioned aspects (e.g., the role of effort and time) provide the first indications. While several studies indicate that the availability of F&V is one of the most crucial environmental factors for children's F&V consumption (Blanchette & Brug, 2005; Corwin, Sargent, Rheume, & Saunders, 1999; Cullen et al., 2001; Reinaerts, de Nooijer, Candel, & de Vries, 2007; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Vereecken, van Damme, & Maes, 2005; Wind et al., 2006), the conceptualization of accessibility related to children's F&V consumption is a relatively new field of study (Blanchette & Brug, 2005; Cullen et al., 2003; Reinaerts et al., 2007; Wind et al., 2006). Researchers increasingly differentiate between the availability and accessibility of foods, with availability related to the presence of foods in the environment and accessibility concerning whether the foods are available in a form as well as at a location and time that facilitates their consumption (Blanchette & Brug, 2005; Cullen et al., 2003; Reinaerts et al., 2007; Swanson, Branscum, & Nakayima, 2009). Accessibility, particularly in the form of convenience (e.g., ready-to-eat pieces of apples in the refrigerator), can have a major influence on children's as well as adults' food consumption (Cullen et al., 2003; Swanson et al., 2009; Wansink, 2004; Wansink & Sobal, 2007). Pre-sliced F&V might be more appealing to children than whole fruit because it is easier and tidier to eat. Therefore, schoolchildren may avoid F&V not because of a lack of preference for a specific fruit or the attractiveness of competing foods (Birch, 1999; Brug, Lechner, & de Vries, 1995; Tohill, Seymour, Serdula, Kettel-Khan, & Rolls, 2004), but because it is 'inconvenient'. Furthermore, accessibility is especially important in explaining intake when children have a low liking of F&V (Cullen et al., 2003; Reinaerts et al., 2007). For example, Reinaerts et al. (2007) showed that, for children with a high preference for F&V, availability is the main factor for consumption, whereas, for children who dislike F&V, accessibility is an important requirement for consumption.

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