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An insight of the Mauritian consumers' awareness, perceptions and expectations of functional foods

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Abstract: During the past few decades, consumers have switched from an emphasis on satisfying hunger to an emphasis on the promising use of foods to promote well-being and to help reduce the risk of disease. This is particularly the case for the island of Mauritius where a variety of functional food products with different health claims have been observed in major supermarkets around the country. Since acceptance of functional foods depends largely on the awareness and perceptions of Mauritians regarding these foods, consumer research on functional foods remains vital. This study investigated the level of awareness and knowledge of Mauritian adults concerning functional foods and their purported health benefits. In addition, the perceptions of respondents towards health-enhancing foods and their willingness to try functional foods were also studied. Information pertaining to knowledge, awareness, perceptions and interest regarding functional foods as well as socio-demographic characteristics were collected from a representative random sample of 384 Mauritian adults aged above 18 years. The survey was conducted in 8 supermarkets and shopping centres of Mauritius. The data indicated that though 85.5% of participants were aware of foods which may help in preventing certain diseases, only 13.8% of the sample population was familiar with the term 'functional foods'. Pearson Chi-Square test indicated that awareness of functional foods was dependent on gender ($p<0.05$), age ($p<0.01$), level of education ($p<0.01$), monthly household income ($p<0.01$) and health status of respondent ($p<0.01$). Besides, perceptions of respondents towards health-enhancing foods were relatively positive and 84.6% of them were willing to try functional foods in the future. The results indicated a relatively low level of awareness and knowledge concerning functional foods in Mauritius but also noted an interest of the consumers for these products.

Keywords: Functional Foods, Awareness, Knowledge, Perceptions, Health Benefits

1. Introduction

Ever since a relationship has been established between diet and health, food is no longer perceived merely as a means to satisfy hunger, prevent deficiency diseases or to provide the essential macronutrients or micronutrients; it has become the primary vehicle to transport human beings along the road of optimal health and wellness [1]. This 'changing face' of food has led to the emergence of the exciting area of functional foods [1]. Generally all foods are functional through their provision to the body of energy and nutrients necessary for survival, but as the science of food and nutrition has advanced to designing foods that promote optimal health and reduce the risk of diseases, the term functional food has evolved. A number of studies have indicated the health claims of functional foods particularly due to the biological effects of their functional ingredients [2-4].

The functional food industry has been flourishing in developed countries over the past few decades, boosted by the global high prevalence of non-communicable diseases (NCDs) and obesity. NCD deaths are projected to increase by 15% globally between 2010 and 2020 to 44% in the regions of Africa, South-East Asia and the Eastern Mediterranean [5]. Mauritius, an island nation in the Indian Ocean of about 2000 km2 and with around 1.2 million inhabitants has unfortunately not been spared. The country has witnessed a major transition in the burden of diseases, shifting from communicable diseases to non-communicable diseases over the decades. The WHO global status report on

NCDs 2010 for Mauritius has shown that NCDs were responsible for 87% of all deaths with the proportional mortality (percentage of total deaths, all ages) being cardiovascular diseases (87%), cancers (12%), respiratory diseases (5%), diabetes (23%) amongst others. Indeed, these diseases are devastating scourges and despite the recent surge in new conventional drugs to treat and/or prevent the latter, NCDs prevalence continues to rise significantly, thereby prompting the use of functional foods.

Whilst the majority of studies focused on consumers' behaviour and attitudes towards functional foods in developed countries [6] leaving out potential emerging markets, the escalating burden of chronic diseases faced by developing countries favours the use of functional foods as part of the continuing effort to promote public health.

As Mauritius is undergoing a number of changes in lifestyle, dietary and disease patterns, it can be envisaged that the consumers would rely on the health benefits imparted by functional foods available locally. However, since awareness and knowledge of functional foods is vital for consumer acceptance of the latter, this study aimed at investigating the level of awareness and knowledge of Mauritian adults concerning functional foods and their purported health benefits. In addition, the perceptions and expectations of the consumers towards these health enhancing foods were also studied.

2. Methodology

2.1. The Market Survey

A market survey was carried out in one of the large scale retail outlets to have a notion of the different functional food products available on the Mauritian market. The data from the market survey was used to design part of the questionnaire.

2.2. Questionnaire Design and Piloting

A self-designed questionnaire was developed which included 16 multiple choice and 7 Likert scale questions to determine the level of awareness, knowledge, perceptions, and the interest of Mauritian adults concerning functional foods and their willingness to try these foods. Ten functional foods with generic product category names complemented with a special effect that maintained or promoted health or decreased the risk of disease were selected to measure the respondent's awareness of such products and willingness to use functional foods. In addition, respondents needed to give specific responses for one question. As part of the validation process, pre-tests were conducted to refine the questionnaire prior to its use in the field.

2.3. Sample Size and Data Collection

2.3.1. The Target Population

The target population was the Mauritian adult and the adult population size is estimated to be around 900,000 [7]. Hence, for results with a 95% level of certainty, a minimal sample size of 384 was required for a population of 900,000 inhabitants [8]. Only volunteers who were above 18 year and were the primary household food purchaser were included.

An information sheet was attached with the questionnaire which gave an explanation of the survey being conducted, its purpose, a definition of functional foods and some of its examples. Furthermore, it also contained the rights of the participants and further informed participants that their responses will be dealt with in strict confidentiality.

2.3.2. Data Collection

Participants were recruited from 4 shopping centres and supermarkets found in the urban area of Port-Louis and from 4 supermarkets found in the rural regions of Goodlands and Grand-Baie during the months of November to December 2011. The questionnaires were distributed randomly to respondents willing to participate in the survey. The questionnaire was self-administered, however one-quarter of the respondents (n=96) were assisted in filling the questionnaire.

2.4. Data Processing and Analysis

Statistical analyses of coded questionnaire data were performed using SPSS version 16.0 and charts were generated using Microsoft Excel 2007. Cross-tabulations of relevant variables were conducted and Pearson Chi-square tests were used to investigate the relationship between variables of interest. For Likert scales, mean scores were calculated and tabulated.

3. Results

3.1. Demographic Profile of Respondents

The socio-demographic profile of respondents has been summarized in Table 1. A total of 384 respondents aged between 18 to above 60 years old participated in the study, out of which 43.8% were males and 56.2 % were females. Across the overall sample, 51% had completed secondary level education while 46.9% having completed an undergraduate course. The majority (39.3 % and 30.2%) of the respondents were between the age group of 18-29 and 30-44 respectively. Besides, most of the participants were from middle-income or upper income groups since the 46.4% and 30.2% of them earned a monthly household income ranging between Rs. 20,000 to Rs. 29,999 and Rs.30, 000 to Rs.39, 999 respectively.

3.2. Knowledge and Perceptions on Nutrition and Health

95.8% of the participants indicated that there was a relationship between nutrition and health. It was noted that females (55.2%) were more aware of the link between nutrition and health as compared to men (44.8%). Besides, 72.1% of the respondents claimed to be in good health while 90.4% of them believed that adopting a healthy lifestyle helps in maintaining or improving overall health. The ma-

jority (89.1%) of the participants indicated that they had modified their diet to eat more healthily.

3.3. Knowledge and Awareness about Functional Foods

Whilst a high proportion of the sample population was aware of the potential health benefits of nutrition, only 53 (13.8 %) participants from the sample population had heard about the term "functional foods". Female consumers aged between 18 and 29 years and educated above secondary level were the ones who showed greater awareness. Pearson Chi-Square test indicated that awareness of functional foods was dependent on gender, age, level of education, monthly household income, health status of respondent and whether they had made changes towards adopting a healthier eating lifestyle (Table 2) and no significant association was found between awareness of functional foods and the area of residence of the respondents (p=0.722).

Table 1. *Frequency distribution of socio-demographic characteristics of respondents.*

Characteristics	Category	Number of Respondents	Percentage of Respondents (%)
Gender	Male	128	43.8
	Female	216	56.2
Age Group	18-29	151	39.3
	30-44	116	30.2
	45-59	101	26.3
	>60	16	4.2
Area of Residence	Rural	217	56.5
	Urban	167	43.5
Highest Level	Primary	7	1.8
of Education	Secondary	196	51.0
Attained	Undergraduate	180	46.9
	Postgraduate	1	0.3
Monthly	<Rs.10,000	3	0.8
Household	Rs. 10,000-19,999	85	22.1
Income Level	Rs. 20,000-29,999	178	46.4
	Rs. 30, 000-39,999	116	30.2
	>Rs. 40,000	2	0.5

Table 2. *Relationship between awareness of functional foods and some selected variables.*

Variables	p Value
Gender	0.040*
Age	0.000**
Area of Residence	0.722
Education Level	0.000**
Monthly Household Income	0.003**
Health Status	0.001**
Made changes towards eating healthier	0.000**

*Level of significance as determined by Pearson Chi-square test: *p<0.05; **p<0.01*

All the respondents who believed that adopting a healthy lifestyle pattern aided in enhancing or maintaining overall health were aware of functional foods. A significant relationship between awareness of functional foods and belief that adopting a healthy lifestyle pattern helped in maintaining or improving overall health (p=0.000) was indeed found. No significant relationship was found between awareness of functional foods and awareness of foods which may help prevent diseases (p=0.075).

The data indicated that more than 50% of respondents had heard about calcium, vitamin D, dietary fiber, omega-3 fatty acids as well as antioxidants and they were also aware of the health benefits of these components. However, only a minority of respondents had heard of and was aware of the health benefits of food components/nutrients such as lycopene, probiotics, polyols, phytoestrogens, prebiotics, and plant stanols/sterols (Figure 1).

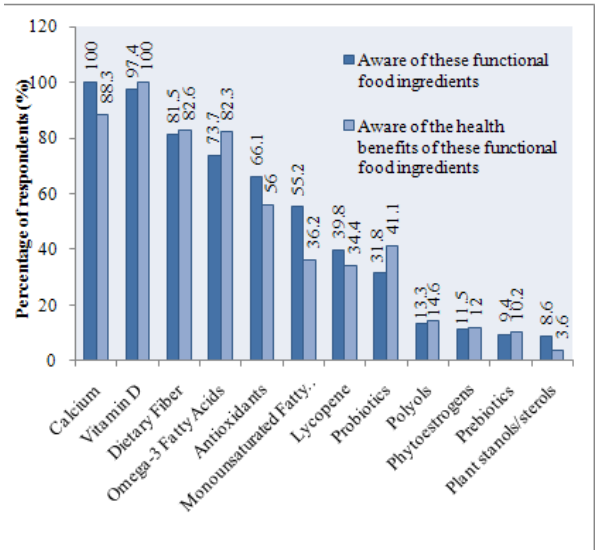

Figure 1. *Awareness of respondents regarding various food components/ nutrients and their health benefits.*

The most common food products included margarine rich in omega-3 and 6 (95.6%), cereals rich in fibers (91.9%),

milk with health claims regarding strong bones (91.7%) and cholesterol-free margarine (88 %). However, food products such as blood sugar reducing tea (39.8%), blood fat reducing tea (39.6%) and soymilk rich in calcium (51 %) were less familiar (Figure 2).

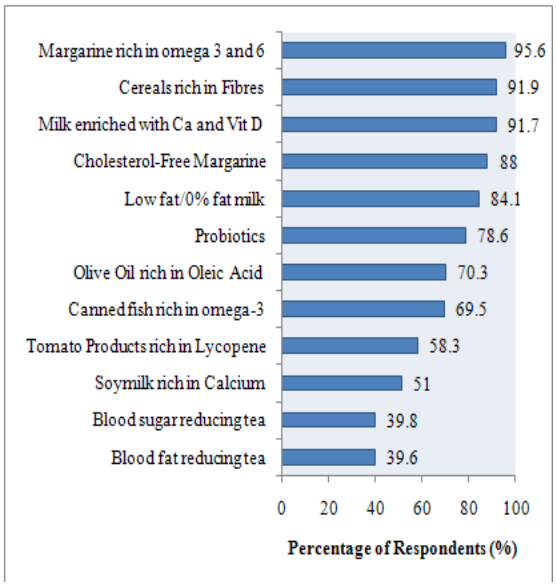

Figure 2. *Percentage of respondents who had encountered food products with particular health claims .*

3.4. Perceptions of Respondents Concerning Functional Foods

Ten statements were used to determine perceptions of respondents concerning functional foods. They had to select from a response scale ranging from strongly agree (average score=1) to strongly disagree (average score=5), with a 'not sure' option (average score=3) to include the possibility of lack of opinion. In general, the average scores indicated that respondents agreed upon statements concerning efficacy of functional foods to prevent diseases, trust of functional foods, preference for natural foods and high content of additives in functional foods.

Out of the 384 respondents, 234 (60.9%) agreed that functional foods could prevent the onset of certain chronic diseases and 220 (57.3%) even agreed with the statement that functional foods were worth the extra cost. However, 241 (62.8%) participants believed that these health-enhancing foods could be harmful if consumed regularly as they contained lots of additives while 225 (58.6%) agreed that health claims on functional foods was just a means to attract consumers.

Furthermore, perception of respondents regarding the healthiness of functional food products was also determined using a response scale ranging from 'not healthy at all' (average score=1) to 'very healthy' (average score=5). The respondents considered almost all the listed food products with particular health claims as 'healthy'. Exceptions included tomato paste or tomato products rich in lycopene; blood fat and blood sugar reducing tea since an average score of 3 was obtained, indicating that participants were uncertain towards these food products.

3.5. Respondents' Interest in Functional Foods and their Willingness to Try These Foods in the Future

96.6% of the sample population were keen to learn more about functional foods while 325 (84.6%) of them were willing to try functional foods in the future. Pearson Chi-Square test demonstrated that there was indeed a significant relationship (p=0.000) between interest in functional foods and eagerness to try functional foods. Furthermore, the results also indicated that interest in functional foods and willingness to try these foods was highest among females; aged between 18-29 years; living in rural areas; having an education beyond primary level and earning a monthly household income ranging between Rs. 20,000-29,999. The data clearly showed that interest in functional foods was significantly associated with gender (P=0.032), age (p=0.049) and monthly household income (p=0.000).

A number of factors, in particular health benefits of functional foods, clear evidence of efficacy and a decrease in price and health benefits of these foods were found to be the most important factors that would encourage respondents to try functional foods in the long run (Figure 3). However, 6% respondents indicated that they were unwilling to use functional foods. They related their unwillingness to try functional foods to the high cost of those food products (76.3%), the high level of chemical additives (75.8%), to their preference for natural foods (68.8%) and also to their skepticism concerning the efficacy of these foods in their claim to improve health (68%).

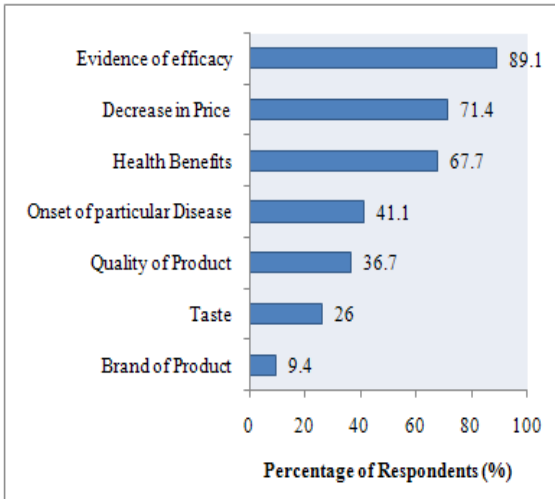

Figure 3. *Factors explaining respondents' willingness to try functional foods in the future.*

The survey instrument employed a seven-point Likert-scale (from "most credible"=1 to "least credible"=7) to solicit reliability level of sources of information about functional foods. Respondents preferred to receive information about functional foods from dieticians/nutritionists,

followed by doctors and homeopaths or naturopaths. Out of 384 participants, 191 believed that dieticians/nutritionists were the most reliable sources of information. Besides, the internet was considered to be the least reliable source of information (n=123).

4. Discussion

Consumer knowledge and perceptions regarding diet and health has become crucial in view of the growing concerns about diet's impact on health [1]. With the emphasis being on cost-effective health care, the importance of dietary changes for improved health and disease prevention is widely acknowledged. The choice and actions related to food taken by consumers have been indicated as determining factors in improving and maintaining health status. Although the predominant focus has been on broad dietary changes, the beneficial effects of functional foods in improving the state of health and/or reduction of risk of disease [9-11] has triggered interest in understanding consumer knowledge, attitudes and perceptions towards functional foods.

Data from this study indicated that only 13.8% of the sampled Mauritian consumers were familiar with the term "functional food" despite the fact that the majority of the consumers who participated were aware of the link between diet and health. Awareness of such a relationship is believed to be the first step in motivating interest for acquiring knowledge concerning healthy eating choices [12, 13]. This study showed that females were more aware of the association between nutrition and health probably because women were more likely to give importance to healthy diets than men and were typically more interested in and knowledgeable about diet and health issues than men [13, 14].

Furthermore, a high rate (89.1%) of participants claimed to have made positive dietary changes over the past two years. The most common factors leading to dietary changes were health benefits from the changes, media promotion and incidence of diseases in the family. Such measures might have been influenced by the massive promotion of healthy eating habits through television/radio programs, nutrition counselling and nutrition related advertisements conducted by the Ministry of Health and Quality of Life. As in [15] adults were more willing to modify their strongly ingrained unhealthy eating habits if their health was at risk especially due to chronic diseases. The primary perceived barriers to healthy eating nevertheless were the taste of food and lack of time to prepare healthy food. These findings call for interventions that focus on quick, easy and tasty healthful food preparation or selection of more convenient healthful food may aid in overcoming barriers to healthy food intake [16]. Lack of knowledge and cost did not seem to be important barriers amongst the study population.

The low familiarity with the term functional food amongst the respondents concurred with a study conducted in Mauritius [17], thereby indicating no major improvement in the awareness level of functional foods over the past five years. This can be attributed to the fact that "functional foods" is not a well-defined food category [18] and also because Mauritius lacks adequate legislations and regulatory framework for these foods.

A statistically significant relationship was observed between awareness of functional foods and gender, age, level of education and income level. Females were more aware of functional foods ($p=0.040$) than men, an observation which correlated with the fact that women were the primary food shoppers and were typically accountable for most of the family food purchases and preparation. Furthermore, studies have shown that females had a higher interest in health in general [19, 20] and were consequently more interested in functional foods [21].

The participants aged between 18-29 years were more aware of health-enhancing foods compared to the older ones. A number of factors, particularly inquisitiveness and higher perceptions of the health benefits of functional foods could account for this finding. However, gender and age were not significantly associated with awareness of functional foods among Italian shoppers (n=200) as reported by Annunziata and Vecchio [21]. In addition, no relationship was demonstrated between awareness of functional foods, education level, as well as age and sex in a study conducted in Greece [22]. Although the subjects in this study were randomly selected, conducting the survey at the shopping centres led to some degree of bias since most of the subjects were educated and were having a high income. Such consumers were most probably those who were most likely to be interested in health claims for food when making purchase decisions.

No statistically significant relationship was observed between awareness of functional foods and region of residence. The data paralleled the findings of [17]; however, as stated by Lajolo [23] respondents from urbanized regions of America were more knowledgeable about functional foods and the importance of diet to health and well-being as compared to those in rural areas mainly due to media or even cultural traditions.

This study also indicated that awareness of functional foods was positive among a minority of respondents who believed in maintaining a healthy lifestyle pattern and attempted to adopt a healthier eating pattern over the past two years. A significant association ($P=0.000$) was observed between functional food awareness, healthy lifestyle and health-consciousness. Chen [24] also indicated that health consciousness and healthy lifestyle had a positive influence on consumers' attitudes towards functional foods.

In Mauritius, although no official statistics are available, a market study conducted showed the availability of a wide variety of functional foods on the local market and these products were thus included as options in the questionnaire. Subjects were familiar with the food components/nutrients namely calcium, vitamin D, dietary fiber, omega-3 fatty acids as well as antioxidants and they were also aware of their potential health benefits. However, level of awareness regarding lycopene, probiotics, polyols, phytoestrogens,

prebiotics, and plant stanols/sterols was relatively lower among the subjects. These results are in line with the IFIC 2007 survey [25].

Similarly, respondents were particular about the health benefits of omega-3 fatty acids especially because of the wide variety of products mainly margarine and cooking oil enhanced with omega-3 fatty acids on the shelves as well as because of the massive promotion of these products for their cardio-protective effects. Moreover, the high level of awareness to antioxidants could be attributed to the wide range of products rich in antioxidants available on the local market, e.g. fruits, vegetables, processed fruit juices and tea rich in antioxidants [26, 27]. However, the beneficial effects of lycopene, probiotics, polyols, phytoestrogens, prebiotics, and plant stanols/sterols were not familiar which could be ascribed to a low promotion of food containing these bio-active components.

The study also indicated that respondents had mixed perceptions about functional foods. In general, the majority of respondents (60.9%) agreed that the use functional foods could be efficient preventive measures against chronic diseases. This finding is in line with Verbeke [28] who reported that the belief in the health effects of functional foods was the most crucial factor influencing consumers' acceptance of the foods. Besides, 57.3% of the participants agreed with the statement that functional foods were worth the extra cost, indicating their trust in these pro-health foods, although a number of studies have suggested that only affluent consumers perceived these foods as affordable and thus the high prices have been viewed as obstacles for purchasing these food [29, 30]

Concerns were also expressed by the respondents regarding the health risks due to regular consumption of functional foods as the latter were perceived to contain high amounts of chemical additives. This finding corroborates with [31] who reported that interest in naturalness of foods have increased due to debates regarding foods additives as well as the techniques used to produce these food, in addition to consumers trusting the link between naturalness and healthiness [30]. This, therefore, correlates with the findings of this study whereby the majority of respondents (n=214) claimed their preference for natural foods over functional foods.

Since health claims on food products could incite consumers to find an association between the functional ingredient and its health effect [32], the perceptions of participants regarding the healthiness of a variety of functional foods with particular claims available on local markets were analyzed. The findings demonstrated that consumers considered almost all these food products as healthy, indicating that they trusted the health claims on the products. However, skepticism was expressed regarding tomato paste or tomato products rich in lycopene, claiming to reduce risk of cancer and cardiovascular diseases or blood fat and blood sugar reducing tea probably because respondents were unaware of these functional food ingredients and hence they were doubtful about the efficacy of those products. However, as indicated by [33] it was not clear whether respondents' ratings of healthiness were based on their assessment of the product's overall healthfulness or related to the potential health benefits of the product.

Perceptions of consumers regarding functional foods consequently affect their willingness to use these foods in the future particularly since perceived reward from using functional foods was the best predictor of consumers' willingness to use functional foods [20]. Data from this study indicated that respondents were relatively inquisitive as the majority (96.6%) of them showed interest to learn more about functional foods whilst 84.6% indicated their willingness to try these foods in the future, forecasting the bright future of functional food in Mauritius. Females and the younger population aged between 18-29 years could be the main targets of functional food manufacturers since a significant association was found between these variables and the willingness to try functional foods.

Health benefits of functional foods, clear evidence of efficacy and a decrease in price of functional foods were found to be the determining factors that would increase the eagerness of the sample population to use these foods in the future. Hence, possible measures have to include subsidies on these food products which would potentially increase its use among Mauritians. Besides, regulatory framework has to be established so as only functional food products with sufficient evidence of efficacy as well as safety of use are available for sale.

Besides health-related benefits and clear evidence of efficacy, credibility of the sources of information regarding the food product remains one of the positive determinants of consumer acceptance of functional foods [34]. Consumers from this study felt that the most reliable source of information regarding functional foods could be provided by dieticians/nutritionists, followed by doctors and homeopaths or naturopaths, signifying that consumers trusted information provided by health professionals. As part of the continuing effort to promote public health, health professional could thus help in the endeavour of promoting functional food in view of its potential health benefits. Annunziata and Vecchio [21] also showed that high level of trust of consumers with regards to health benefits of food was from doctors and public authorities while a lower degree of confidence was afforded to producers.

5. Conclusion

Although, there was a low familiarity with regards to the term "functional foods", Mauritian consumers seemed to be aware of the link between food and health. A number of functional food products were present on the local market. Whilst added vitamins/minerals in functional foods were known to the consumers, other products rich in phytoestrogens, probiotics, prebiotics and stanols were not very popular. In view of the health claims supported by epidemiological and clinical studies of these functional foods, effective health programs and appropriate marketing strat-

egies should be developed notably due to the low level of awareness and knowledge of functional foods among the Mauritian population despite the wide availability of such food on the local markets. Hence, with regards to the vast therapeutic benefits of health-enhancing foods, besides implementing a regulatory framework for these foods in Mauritius, consumer education by dieticians, nutritionists or by independent food organizations remains crucial to promote more healthful dietary choices.

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