

1 A Mixed-Methods Assessment of a New Supermarket in a Food Desert: Contributions to
2 Everyday Life and Health

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25 ABSTRACT

26 Initiatives to build supermarkets in low-income areas with relatively poor access to large food
27 retailers (“food deserts”) have been implemented at all levels of government, though evaluative
28 studies have not found these projects to improve diet or weight status for shoppers. Though
29 known to be influential, existing evaluations have neglected in-store social dynamics and
30 shopper behaviors. Surveys and walking interviews were used with shoppers (n=32) at a
31 supermarket developed through the Pennsylvania Fresh Food Financing Initiative in
32 Philadelphia, PA. Key informant interviews with stakeholders in the supermarket’s development
33 and operations provided additional context to these shopper experiences. Data were collected in
34 July and September 2014 and qualitatively analyzed in NVivo 10.0. Participants described how
35 the retailer helped them adapt or cope with difficult shopping routines and how it presented a
36 reliable high-quality option (in terms of cleanliness, orderliness, and social atmosphere) in
37 contrast to other neighborhood retailers. Health concerns were also identified, especially among
38 those managing chronic disease for themselves or a family member. These issues underscored
39 multiple points of challenge required to adjust shopping and eating behavior. In-store supports
40 are warranted to more fully address food deserts and reduce health disparities.

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42 KEYWORDS: food access; food deserts; supermarkets; healthy food financing

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48 INTRODUCTION

49 A wide body of research has described the environmental contexts in which diet - including food
50 purchasing and consumption - takes shape for individuals and households. Significant
51 associations between the quality of these “food environments,” health behaviors [1] and health
52 outcomes [2] have been observed across numerous geographies in the US and elsewhere, though
53 findings are not uniform across all studies [3]. While the causal pathway between food access
54 and diet is not well understood [4], a variety of federal, state, and local initiatives have emerged
55 to incentivize supermarket development in low-income, underserved communities (“food
56 deserts”) [5].

57
58 Existing evaluations of new supermarkets in food deserts have found that residents’ food
59 environment perceptions may improve when new stores open [6], though few show improvement
60 in consumption of healthy foods or health status [6–8]. Of studies finding improvements in
61 healthy purchasing, these changes are not attributable to the use of the new retailer [9,10].
62 Evaluations also highlight the importance of in-store environment, including pricing, placement,
63 and promotions, in motivating behavior change [6,11], though none have explored shoppers’ in-
64 store experiences.

65
66 Previous qualitative research on food shopping by low-income households, including both
67 observational and interview-based methods, offers specific context for this inquiry. First, studies
68 show how low-income shoppers adapt their grocery trips to a variety of constraints, including
69 issues of time, transportation, physical ability, and income, as well as retailer characteristics
70 factors such as sales or produce quality [12–16]. Social forces also affect where and how

71 individuals shop; for instance, one study found that shoppers preferred stores they perceived to
72 be safe and easily accessible, but also where other shoppers shared similar racial and income
73 characteristics and where they felt well treated by store staff [12,17]. Once within a store,
74 shoppers also exhibit a wide range of individual agency, ranging from very active engagement
75 (i.e. highly-planned shopping) to passive (i.e. reactive to marketing) [13], and may choose less-
76 healthy options despite having nutritional knowledge, given a variety of immediate constraints
77 [14]. Taken together, these qualitative findings suggest how low-income shoppers select and
78 utilize stores, including their coping strategies to deal with sub-optimal food shopping options,
79 and provide a more proximal perspective on the complex relationship between food access, diet
80 and health.

81
82 As the aforementioned studies have shown, qualitative, in-store methodologies stand to
83 document human behavior within social and cultural contexts, and allow shoppers to articulate
84 the experience of consumer food environments in their own words. While most previous studies
85 considered how different shoppers sort into different types of stores, this study aims to explain
86 how and why consumers select and utilize *a particular store*, its role is in everyday life, and how
87 these dynamics could be meaningful for health. These questions are interrogated by way of
88 walking interviews, representing a novel approach to studying new supermarkets in food deserts.

89

90 METHODS

91 This methodology was approved by the [BLINDED] Institutional Review Board.

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93 Study Area

94 A supermarket in Philadelphia, Pennsylvania agreed to allow research at a store (subsequently
95 referred to as “the case supermarket” or “the store”) developed within the last five years through
96 the Pennsylvania Fresh Food Financing Initiative (FFFI). The store was a medium-sized urban
97 supermarket with a surface parking lot, and nearby several modes of public transportation.
98 Additionally, it was a “full-service” retailer, offering deli, meat, seafood, and prepared food
99 sections. Nearly half of households in the case supermarket’s Census tract were without a
100 vehicle, and nearly one in three reported participating in the Supplemental Nutrition Assistance
101 Program (SNAP) during the last year [18]. The tract was also predominantly African-American,
102 nearly double the citywide rate (42.5 percent of householders).

103

104 Data Collection

105 *Walking Interviews*

106 Walking interviews have been used as a participatory, in-depth field method [19], including
107 studies of consumer food shopping behavior [13,20]. The technique was adapted here to
108 investigate how participants experienced the store environment while they shopped.

109

110 Participants were recruited by intercept as they entered the store. Three visual criteria were used
111 to identify eligible customers: 1) Individuals who had shopping carts, 2) were not using
112 cellphones or headsets, and 3) were not engaged in conversation. Eligible customers who agreed
113 to participate were asked to sign an informed consent form, and offered a \$25 gift card as
114 compensation. Interviewing took place over nine days in July and September 2014, including
115 different times of day, week, and month. Following an initial set of July interviews, additional
116 interviews were conducted in September until thematic saturation was adequately achieved.

117

118 Digital voice recorders and lapel-clipping microphones were used to record interviews.

119 Participants were asked to narrate their shopping trip aloud to the interviewer as they walked

120 throughout the store. Additional prompts were provided as needed to clarify statements and

121 location within the store. For example, if a participant was standing in front of a shelf, the

122 interviewer may have asked, “What are we looking for here?” After participants had proceeded

123 through checkout, a brief (5-10 minute) survey was administered and they were given the gift

124 card.

125

126 *Shopper Survey*

127 Validated measures of food environment perceptions, fruit/vegetable consumption, and readiness

128 to adopt healthier behaviors were adapted to create a composite survey instrument [21–24].

129 Additionally, surveys were used to collect a variety of shopper demographic information and

130 other characteristics.

131

132 *Field Notes*

133 The interviewer took field notes at the end of each site visit, including notable incidents or

134 circumstances, such as weather conditions or conversations with store staff. These allowed for

135 preliminary identification of shopper patterns, possible methodological improvements, and

136 consideration of when thematic saturation had been achieved.

137

138 *Stakeholder Interviews*

139 During 2013 and 2014, semi-structured interviews were completed with ten participants who had
140 affiliations with FFFI or had specific knowledge about the case supermarket. Specific to the case
141 supermarket, interviews included a store manager, director of human relations, director of
142 community relations, and local law enforcement official who worked in the neighborhood and
143 used the store as a “home base.” These interviews helped to place the walking interviews - the
144 basis for this paper - within broader, structural contexts.

145

146 Data Analysis

147 *Survey Analysis*

148 Survey data were entered into an SPSS (Version 22) database. Additional fields were added to
149 document participant’s race and gender (as perceived by the interviewer), and trip duration. The
150 straight-line distance between the case supermarket and the intersection nearest to the
151 participant’s home was calculated in ArcGIS 10.1. Descriptive statistics were generated to
152 summarize participant characteristics.

153

154 *Transcription and Coding*

155 Audio files were transcribed verbatim, and transcripts were used to establish a preliminary list of
156 codes based on recurring themes and concepts [25]. Two researchers with qualitative coding
157 experience independently analyzed ten transcripts to create a list of codes and definitions.
158 Following this preliminary code development, codes and definitions were compared, and
159 discrepancies were resolved. The researchers returned to ten additional transcripts and applied a
160 closed-coding method in separate NVivo (Version 10.0) projects. An NVivo report was

161 generated to document agreement between coders; levels below 70% were flagged, discussed
162 and re-coded in a subsequent meeting.

163

164 Coding themes included attitudes about the store, food perceptions, shopping logistics, health
165 attitudes, and the type of trip being completed. These themes broadly describe the value of the
166 supermarket in everyday life, and health attitudes and behaviors.

167

168 RESULTS

169 Description of Sample

170 Thirty-two (n=32) individuals were recruited and signed the consent form. Participants were
171 predominantly women (n=27) and African Americans (n=31). Nearly all participants identified
172 themselves as the primary food shoppers for their household (N=31). Participants voiced very
173 little disagreement in terms of their attitudes and beliefs about healthy eating (see Table 1).

174 Almost three-quarters of participants (n=23) reported receiving SNAP benefits. The majority of
175 participants reported purchasing most of their groceries (n=22) and fruits and vegetables (n=20)
176 at the case supermarket.

177

178 Other participant characteristics are summarized in Table 1, and Figure 1 provides a spatial
179 representation of several variables. Participant responses were also binned by those who lived
180 within one mile (n=19) and those who did not (n=13) (see Table 2).

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184 Table 1. Descriptive Statistics from Shopper Survey

	Valid N	Mean	SD
Trip Duration (minutes)	32	0:29	0:14
Trips to Case Supermarket Per Month	32	6.8	6.5
Household Size (persons)	32	2.7	2.0
Age (years)	31	53.0	12.5
Distance from Case Supermarket (miles)	32	1.9	4.0
Fruit and Vegetable Consumption (times eaten per week)	30	12.3	4.0
My family dislikes the taste of vegetables ^a	30	2.3	1.1
I dislike the taste of vegetables ^a	32	1.9	0.7
It's hard to include fruits/vegetables in meals when I'm tired ^a	32	2.8	1.0
Fruits and vegetables are good for the body ^a	32	4.4	0.5
I'm happy with the quality of groceries in my neighborhood ^a	32	3.6	1.1
^a Perceptions/Attitudes (1=Strongly Disagree, 5=Strongly Agree)			

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194 Table 2. Participant Food Environment Perceptions ^a

	Distance to Participant Home	
	≤1 Mi	>1 Mi
Happy with the quality of groceries in my neighborhood ^b	89.5%	38.5%
Fruits and vegetables are easy to find in my neighborhood ^b	78.9%	61.5%
Purchase most of groceries at this supermarket ^c	89.5%	38.5%
^a Calculated from valid responses within distance bins ^b Measured by reporting “Agree”/”Strongly Agree” ^c Measured by reporting “Yes”		

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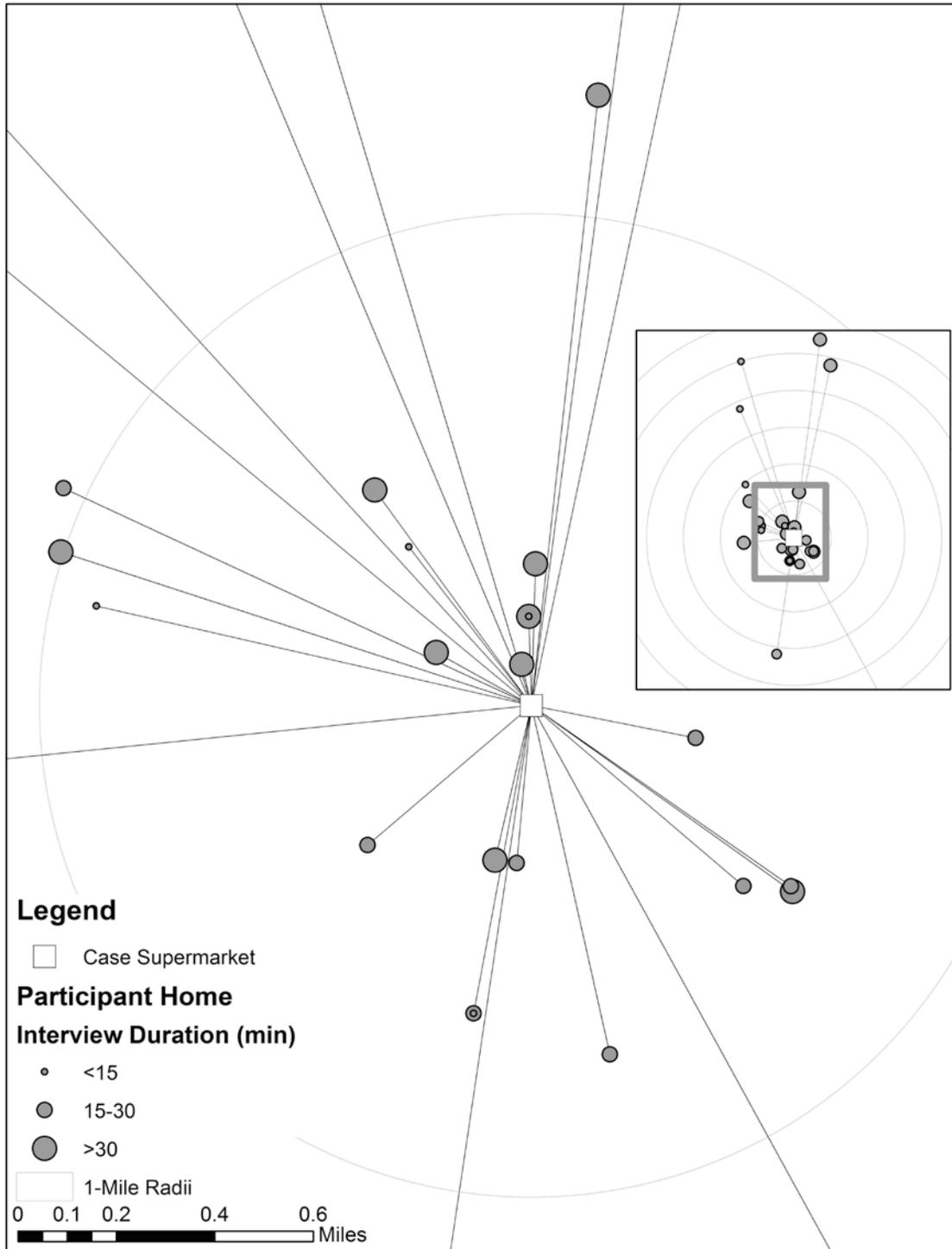
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208 Figure 1. Participant Distance to Case Supermarket



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210 Caption: Participants came from a variety of neighborhoods to shop at the case supermarket, as

211 measured by the street intersections closest to their homes.

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Role of Case Supermarket in Everyday Life

Many participants mentioned a variety of constraints that influenced their shopping, including their current trip to the case supermarket, as well as methods for coping and the role of the case supermarket in these strategies.

Transportation

Participants cited a variety of strategies for dealing with the complexity of transportation for food shopping. Several participants adjusted the size and quantities of purchases to their transit type. One participant described this practice as using “wisdom” while shopping; in her case, this meant limiting the number of items to allow her to ride a city bus comfortably. Another participant (age: 57) employed a similar strategy by using a rolling luggage bag to carry items from the store to work; ultimately, this allowed her to go home after work without grocery shopping. Others who lived nearby also completed smaller shopping trips with the intention of returning later in the day or week.

Several participants coordinated with family, friends, or neighbors to use personal vehicles for shopping. For some, this strategy was not an option, though they still desired the ability to make trips with a vehicle (i.e. not walking or using transit). One participant (51) described how her transportation for food shopping was even more complex before the case supermarket opened: “I had to go further. And pay a hack-man [informal cab driver] to bring me home. Hack-man want like... ten dollars.”

235 Participants also could use a free shuttle provided by the case supermarket if they spent over \$60.
236 Though popular, this service was not without caveats. In the words of one participant (51):
237 “[Y]ou have to spend like a hundred or... close to a hundred, yeah. That's pretty um... nerve-
238 wracking. You have to stand out there and wait in the heat, and you got ice cream and stuff,
239 while he's taking other people.” Another participant (61) finished her shopping over an hour
240 before the shuttle started, unfortunately on one of the hottest days of the year: “Aw man, a whole
241 hour to wait. [...] Feel that heat already.”

242
243 Perhaps the best illustration of the potential complexity of shopping trips came from one
244 participant (51) who had traveled to the case supermarket via multiple forms of public
245 transportation. She was devastated to learn that the shuttle was only offered within a three-mile
246 radius of the store, derailing her plans for a large shopping trip: “I can't go shoppin' here like I
247 want to and I don't have the transportation and I don't have the money to pay for no hack driver.”
248 At this point, she pulled out a transit pass, an eight-dollar ticket that provides up to eight rides, to
249 illustrate how her plans were disrupted: “I gotta get on another bus, get on that bus, then I don't
250 know, it's like, oh goodness. So... I gotta check out. [...] See what we gotta go through. Goin'
251 shoppin'?” The complexity of this participant’s trip to and from the store dramatically limited her
252 ability to complete the trip as she had hoped.

253
254 Transportation complexity was not limited to those without a personal vehicle. Even among
255 individuals who drove themselves to the store, issues such as the price of gasoline or the physical
256 challenge of carrying groceries up apartment stairs at home also affected how participants
257 framed their shopping trips. A few participants also described situations where they were unable

258 or unwilling to drive, though a vehicle was available: one because of a recently revoked driver's
259 license, and the other possibly because of her declining eyesight (identified during other
260 interactions throughout the store). Thus, while private vehicles posed a potentially-important
261 resource for grocery shopping, their utility was not uniform across all participants.

262

263 *Price Comparisons*

264 Price comparisons between stores were common. One participant (46) offered a frequently
265 echoed description of this strategy: “[T]hey give us sales items in front of our door every week,
266 so I go to each store and see what's on sale and compare prices. So, like I buy certain stuff out
267 here [...] you know, the stuff that I know is gonna cost more at another store, I come here and
268 get it on sale.” Other shoppers already knew about prices at other stores, including a nearby
269 chain pharmacy: “Now, across the street it's \$3.49. Over here, it's \$3.33. So, it's a deal!”

270

271 Nonetheless, this strategy had logistical limits. In the words of one participant (63) as she
272 contemplated paying a few cents more for small item: “You don't save no money be runnin' all
273 around and I gotta, and I'm goin' back home.” Another participant suggested that nearby stores
274 ran similar sales simultaneously, raising the importance of convenience: “Like I said, dependin'
275 on where you like or which is easier for you to get to, when they have a sale like this, usually so
276 does all the other stores.”

277

278 Participants also designated certain types of items to certain types of retailers. Several shoppers
279 who felt the case supermarket's prices were high compared to other retailers (usually
280 supermarkets, but sometimes dollar stores or meat markets) would only buy limited quantities or

281 types of items like meat or fish, leaving those purchases to other retailers. In the words of one
282 participant (36): “Yeah, I come here, like to get things spur of the moment. Little things. But um,
283 I don’t buy meat from over the butcher... They too high.” Alternatively, the wide assortment of
284 name brand products offered by this supermarket appeared to be an enticing factor compared to
285 other, perhaps cheaper, neighborhood stores.

286

287 *Comparative Superiority*

288 Many participants compared the case supermarket to other retailers that were not as favorable in
289 terms of store cleanliness and reliability. As described by one participant: “This store stays pretty
290 clean, you know? When they say they have something on sale, most of the time they have it... It's
291 not like them other stores.” Another participant (63) agreed with the sentiment that the case
292 supermarket was uniquely clean: “I don't like to go in a market and see that the floors haven't
293 been scrubbed, or... it have smells. [...] [I]t seems like they really... They make a point to make it
294 sparkle. So when you come in, it's lit up. And another thing, this is in the community and like I
295 said, senior citizens shop in here. It used to be, one time, you would only seem ‘em at Acme.”

296

297 Similarly, one participant shopping with SNAP benefits was not willing to compromise on her
298 perception of freshness for lower prices. As she shopped with her elementary school-age son, she
299 contrasted the case supermarket to a new discount supermarket nearby: “Yeah, so a lot of people
300 go there now. Because it's way cheaper. But I can't... I'm a picky person, so I have to go where I
301 know the food is fresh, you know? Even if it's a, a franchise, I don't know that it's fresh.” Others
302 extended this concept to food safety; as expressed by one participant: “[Y]ou gotta be careful

303 where you get your meats at. Cause it'll make you sick." Notably, participants differed in their
304 assessment of precisely how the case supermarket's prices compared to other stores.

305

306 *Positive Social Interactions*

307 Participants described positive interpersonal experiences in the case supermarket. According to
308 one participant: "[E]verybody here's nice, really. Everybody, they always treat you nice. If you
309 ask a question, they'll stop [...]. [I]f somethin's not right, then they'll call somebody." Similar to
310 cleanliness and orderliness, this positive social quality was held in contrast to other retailers. For
311 instance: "I've been in a couple markets that's really rude... But this one is really, this one is
312 actually... ok with me." As another example of a positive social perception, one participant (65)
313 described making trips to the case supermarket as way to pass the time: "I live alone. So
314 basically, all my spare time, I'm at home. [...] But when I'm just at home, and nothing else to do,
315 and I start thinking negatively, I'll say I know, I can go to the supermarket, they love me there."

316

317 *Health Attitudes*

318 Several participants mentioned health in several ways, including awareness of health and
319 nutrition, identification of specific items or behaviors (i.e. "low sodium") that were important for
320 health, and descriptions of the challenge of adopting and maintaining health-promoting
321 behaviors.

322

323 *Pursuing Healthier Options*

324 Some shoppers described their choices of specific items based on certain health criteria such as
325 sugar or sodium content, or tried to avoid or modulate their purchases of items that were not

326 reduced-sugar or reduced-sodium. For instance, one participant (63) described her affinity for a
327 specific brand of juice: “I always get my cranberry juice here, too. [...] I always get my Apple
328 and Eve, cause they don't have the added sugar.” Another middle-aged participant spent several
329 minutes searching for a specific package of pretzels with reduced sodium, contemplating
330 alternatives aloud: “Let me see if this is what I want. [...] I like the lightly salted. [...] Sodium
331 content... [reading the nutrition label]. Don't you know I know sodium. So I just have to scrape
332 ‘em.”

333

334 Though fewer in number, some participants were also clear about their pursuit of less-healthy
335 items, such as candy or a slice of cheesecake, categorically referred to as “junk food.” For these
336 individuals, purchases were made with awareness that certain items were unhealthy (“junk”), and
337 could be reliably found inside the store.

338

339 *Managing Conditions for Self or Others*

340 Most participants who described motivations for selecting healthier items cited a need or desire
341 to manage a chronic condition, including diabetes (n=3), hypertension (n=3), or other health
342 issues (n=8), either for themselves or a family member. Explanations of chronic disease
343 management often began as participants selected items with lower sodium or sugar content. For
344 instance, after describing her strong preference for lightly-salted pretzels, one participant
345 elaborated on this motivation and connected it to a chronic health condition: “[Y]ou know, these
346 are better because they don't have as much salt contents on em. But um, you know, people of
347 color, we have high blood pressure, so we have to watch for stuff like that.”

348

349 Health considerations extended beyond sodium and sugar. One participant (67) described a
350 particular supplement he needed: “I’m a dialysis patient, so I need proteins. [...] I have a protein
351 drink that I get from here also. Believe it or not, they have it.” Another participant (25) indicated
352 that her choice of breakfast cereal was motivated by a desire to lower her cholesterol. Yet
353 another participant was purchasing tonic water at the recommendation of her doctor in order to
354 curb painful, diabetes-related leg cramps, while another (51) described a connection between diet
355 and anxiety: “I have certain little stuff goin’ on in the house, like anxiety and my heart be like...
356 And I drink smoothies and eat right and I feel better and I can tell this is playin’ a part and a role
357 in helpin’ me feel better in my health.”

358

359 *Challenge of Change*

360 Several participants spoke about the challenge of improving their diet, especially to manage
361 chronic health conditions. One participant described these choices in the context of a recent
362 medical procedure: “I just had a heart scare... I just had a stent put in. [...] So a lot of the stuff I
363 need to cut out. But I’m doin’ pretty good, and I’ve cut out fried foods and you know... It’s gonna
364 be a process for me.” After describing her “addiction” to potato chips, another participant spoke
365 about her struggle with diet management as a diabetic: “I haven’t 100 percent mastered my eating
366 habits. Um, I want to do better... It is hard. [...] [I]t’s scary when um I uh see an individual, you
367 know, uh who is missing a foot, a toe, and really I get scared.”

368

369 The efforts of family members to improve their diets also revealed challenges. For instance,
370 though one participant was aware of how sodium could contribute to her husband’s high blood
371 pressure, points of tension emerged throughout the shopping trip: “[Y]ou want me to get my

372 regular kind? Seasoning salt? Something I don't need to get?" Yet, at another point, the same
373 participant discussed snack options with her husband: "You want the ones with no salt? No salt?
374 Who eats chips with no salt?" For this couple, negotiations between health awareness and
375 behavior took place across multiple aisles and products.

376

377 DISCUSSION

378 Assist or Modulate Coping Strategy

379 For many, the logistics of grocery shopping are made more challenging by income constraints.
380 Fastidious caution over budgets, sometimes down to the penny, dominated the in-store decision-
381 making for some shoppers. Others, perhaps less guarded in their perusal of the supermarket
382 aisles, faced upsetting results at checkout, sometimes setting aside items "for later." After
383 shopping, many participants had to follow complicated or inconvenient routes home, groceries in
384 tow. The exacerbating effects of trip complexity appeared to turn what otherwise could be
385 inconveniences into potentially large disturbances.

386

387 In light of these logistical challenges, the case supermarket represented a substantive
388 contribution to the task of buying groceries. The location of the store presented an opportunity to
389 shop closer to home or on the way to/from work, enabling a variety of trip-types that would
390 otherwise be unworkable or unreasonable. For example, many participants made smaller, but
391 more frequent trips to deal with challenges transporting groceries home, a strategy that is
392 consistent with previous findings [15]. Some reported having to previously travel much further,
393 often by public transit, to enjoy a similar level of supermarket access or quality, also consistent

394 with other studies [12,15,16]. For many, without the case supermarket, shopping would be
395 worse: more complex, inconvenient, or costly (in time or resources).

396

397 *Clean, Safe, Friendly: A Cosmopolitan Canopy Food Environment*

398 Sociologist Elijah Anderson uses the term “cosmopolitan canopy” to describe urban spaces
399 where otherwise guarded city-dwellers connect with one another under social controls of civility
400 and good behavior, in contrast to more standard controls of indifference and wariness of
401 strangers [26]. Anderson’s socio-environmental construct appears relevant here. As in previous
402 research, participants in this study valued the case supermarket for elements of physical and
403 social civility [12–17]: it was clean, bright, even “sparkling;” it was safe and orderly, reliable and
404 well-stocked; it accommodated the needs of the elderly; it allowed customers to feel respected
405 and well-treated. All of these elements were drawn in contrast to experiences elsewhere; in
406 neighborhoods where this type of food shopping is not the norm, there may be unique
407 opportunities for intervention within these “cosmopolitan canopies.”

408

409 Given the vast complexity and likely stress associated with food shopping trips in low-income,
410 low-mobility neighborhoods, we come to understand the new store as a possible support
411 structure within individual coping strategies. Existing research has described how shoppers in
412 low-income neighborhoods navigate poor quality food environment in light of constraints and
413 preferences, though this study posits that the case supermarket may also function as a socially
414 supportive structure as a civil and convenient resource. Remembering one participant’s
415 characterization of “shopping with wisdom,” it may be easier to be wise while shopping under a
416 cosmopolitan canopy.

417

418 Health Awareness and Change

419 Health proved to be a critical theme for many shoppers in this study. Some participants were
420 keenly aware of the healthfulness of food products, especially those who were actively managing
421 a chronic disease for themselves or others through diet. These participants still described the
422 challenge of changing old habits, despite their desire to change and avoid negative health
423 consequences. If a causal model is considered of new supermarkets affecting resident health
424 outcomes, these individuals are well within the stage of adopting and maintaining positive health
425 behaviors, yet multiple issues remain in this process.

426

427 A variety of participant interactions underscored how changes needed to manage a chronic
428 condition - for most, high blood pressure or diabetes - represented multiple points of challenge,
429 many of which have been identified by previous health research [27]. For example, the
430 participant who, while aware of her husband's condition and its relationship to diet, questioned
431 or undermined his attempts to pursue healthier options. For another participant, managing
432 diabetes was described as an ongoing struggle with food; grocery shopping afforded her some
433 measure of control, though she still faced frequent in-store temptations. These participants
434 demonstrate how, for many with chronic illnesses, there is a plurality of changes and choices that
435 are subject to incentives and barriers, especially in the supermarket environment.

436

437 The challenge of making healthy choices and systematically repeating them was no small task
438 within the context of old habits, limited budgets, preferences, and social factors, including the
439 influence of family. Previous research has illuminated ways to address many of these challenges

440 to healthy eating, including point-of-purchase interventions, though their application to food
441 desert supermarkets appears to be limited and reliant largely on the initiative of individual store
442 operators [28–35,5]. Nonetheless, participants in this study were presented with and did
443 sometimes choose certain healthier options in the supermarket, contextualizing these decisions
444 within larger health concerns. It is also relevant to consider if shopping under the case
445 supermarket canopy, with its associated favorable social structures, presents opportunities to
446 lessen these challenges.

447

448 Limitations

449 This research design has limitations. It is possible participants purchased healthier items in
450 response to the presence of a researcher; favorability bias is difficult to completely avoid in other
451 types of individual-level food environment research. However, bias may be limited here: the
452 interview was a brief and unexpected encounter, limiting a participant’s ability to adjust
453 behaviors; most participants faced firm limits in terms of time or budget; and, the most explicit
454 priming about health came from the survey, which was reserved for after shopping was
455 complete.

456

457 The study also presents a single case of a new supermarket in a food desert. It is possible, if not
458 likely, that individuals respond in different ways to different types of stores. Indeed, all
459 participants were store adopters (though of varying degrees), excluding a subset of potential
460 customers that chose to shop elsewhere. Future studies are needed in different cities and stores to
461 validate, amend, or challenge themes identified here.

462

463 Future Directions

464 While current research is not optimistic about the ability of new supermarkets to influence
465 positive health outcomes, retailers may still play a role in addressing diet-related disease.
466 Anecdotal examples of health-oriented supermarkets [5], suggest that new retailers can and
467 sometimes do explicitly consider health, employing health promotions (conscious decision-
468 making) and nudges (subliminal decision-making) to influence consumer purchasing [29,36,37].
469 Corresponding health and wellness trends in the supermarket industry, including elements such
470 as retail dietitians, nutritional labeling, health screenings, cooking classes, and healthy check-out
471 lanes, all may play a role in creating a more health-promoting in-store environments [5,38].

472

473 As this study has shown, the accessibility and convenience of a neighborhood supermarket can
474 make meaningful contributions to the everyday lives of low-income shoppers. Importantly, this
475 study also conceptualizes an in-store etiology of chronic disease, whereby shoppers carry the
476 daily burden of managing diet-related illness, and that these decisions are difficult and multi-
477 dimensional. Should new supermarkets in food deserts aim to assist shoppers in improving
478 health, these realities must be more fully incorporated as a multi-level health intervention,
479 including available and novel in-store supports for health behavior change, building upon the
480 existing contributions to everyday life.

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486 REFERENCES

- 487 1. Morland K, Wing S, Diez Roux A. The contextual effect of the local food environment on
488 residents' diets: the atherosclerosis risk in communities study. *Am. J. Public Health.*
489 2002;92:1761–7.
- 490 2. Holsten JE. Obesity and the community food environment: a systematic review. *Public Health*
491 *Nutr.* 2009;12:397–405.
- 492 3. Lee H. The role of local food availability in explaining obesity risk among young school-aged
493 children. *Soc. Sci. Med.* 2012;74:1193–203.
- 494 4. Caspi CE, Kawachi I, Subramanian SV, Adamkiewicz G, Sorensen G. The relationship
495 between diet and perceived and objective access to supermarkets among low-income housing
496 residents. *Soc. Sci. Med.* 2012;75:1254–62.
- 497 5. Chrisinger BW. Taking Stock of New Supermarkets in Food Deserts: Patterns in
498 Development, Financing, and Health Promotion. in review;
- 499 6. Cummins S, Flint E, Matthews SA. New Neighborhood Grocery Store Increased Awareness
500 Of Food Access But Did Not Alter Dietary Habits Or Obesity. *Health Aff. (Millwood).*
501 2014;33:283–91.
- 502 7. Lucan SC, Hillier A, Schechter CB, Glanz K. Objective and Self-Reported Factors Associated
503 With Food-Environment Perceptions and Fruit-And-Vegetable Consumption: A Multilevel
504 Analysis. *Prev. Chronic. Dis.* [Internet]. 2014 [cited 2015 Dec 10];11. Available from:
505 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3970773/>
- 506 8. Sohi I, Bell BA, Liu J, Battersby SE, Liese AD. Differences in Food Environment Perceptions
507 and Spatial Attributes of Food Shopping Between Residents of Low and High Food Access
508 Areas. *J. Nutr. Educ. Behav.* 2014;46:241–9.
- 509 9. Dubowitz T, Ghosh-Dastidar M, Cohen DA, Beckman R, Steiner ED, Hunter GP, et al. Diet
510 And Perceptions Change With Supermarket Introduction In A Food Desert, But Not Because Of
511 Supermarket Use. *Health Aff. (Millwood).* 2015;34:1858–68.
- 512 10. Ulrich V, Hillier A, DiSantis KI. The Impact of a New Nonprofit Supermarket within an
513 Urban Food Desert on Household Food Shopping. *Med. Res. Arch.* [Internet]. 2015 [cited 2015
514 Dec 17]; Available from: <http://www.journals.ke-i.org/index.php/index/article/view/236>
- 515 11. Ghosh-Dastidar B, Cohen D, Hunter G, Zenk SN, Huang C, Beckman R, et al. Distance to
516 Store, Food Prices, and Obesity in Urban Food Deserts. *Am. J. Prev. Med.* 2014;47:587–95.
- 517 12. Cannuscio CC, Hillier A, Karpyn A, Glanz K. The social dynamics of healthy food shopping
518 and store choice in an urban environment. *Soc. Sci. Med.* 2014;122:13–20.

- 519 13. Thompson C, Cummins S, Brown T, Kyle R. Understanding interactions with the food
520 environment: An exploration of supermarket food shopping routines in deprived
521 neighbourhoods. *Health Place*. 2013;19:116–23.
- 522 14. Zachary DA, Palmer AM, Beckham SW, Surkan PJ. A Framework for Understanding
523 Grocery Purchasing in a Low-Income Urban Environment. *Qual. Health Res*. 2013;23:665–78.
- 524 15. Munoz-Plaza CE, Morland KB, Pierre JA, Spark A, Filomena SE, Noyes P. Navigating the
525 Urban Food Environment: Challenges and Resilience of Community-dwelling Older Adults. *J.*
526 *Nutr. Educ. Behav*. 2013;45:322–31.
- 527 16. Munoz-Plaza CE, Filomena S, Morland KB. Disparities in Food Access: Inner-City
528 Residents Describe their Local Food Environment. *J. Hunger Environ. Nutr*. 2008;2:51–64.
- 529 17. Zenk SN, Schulz AJ, Israel BA, Mentz G, Miranda PY, Opperman A, et al. Food shopping
530 behaviours and exposure to discrimination. *Public Health Nutr*. 2014;17:1167–76.
- 531 18. U.S. Census Bureau. Selected Economic Characteristics, 2009-2013 5-Year American
532 Community Survey [Internet]. 2013 [cited 2015 Dec 10]. Available from:
533 <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>
- 534 19. Miaux S, Drouin L, Morency P, Paquin S, Gauvin L, Jacquemin C. Making the narrative
535 walk-in-real-time methodology relevant for public health intervention: Towards an integrative
536 approach. *Health Place*. 2010;16:1166–73.
- 537 20. Frasso R. Walking Interviews: Speaking with consumers while they shop where they live.
538 APHA; 2014 [cited 2015 Dec 10]. Available from:
539 <https://apha.confex.com/apha/142am/webprogram/Paper311652.html>
- 540 21. Chuan Ling AM, Horwath C. Perceived Benefits and Barriers of Increased Fruit and
541 Vegetable Consumption: Validation of a Decisional Balance Scale. *J. Nutr. Educ*. 2001;33:257–
542 65.
- 543 22. Henry H, Reicks M, Smith C, Reimer K, Atwell J, Thomas R. Identification of factors
544 affecting purchasing and preparation of fruit and vegetables by stage of change for low-income
545 African American mothers using the think-aloud method. *J. Am. Diet. Assoc*. 2003;103:1643–6.
- 546 23. Kim DJ, Holowaty EJ. Brief, validated survey instruments for the measurement of fruit and
547 vegetable intakes in adults: a review. *Prev. Med*. 2003;36:440–7.
- 548 24. Mainvil LA, Lawson R, Horwath CC, McKenzie JE, Hart I. Validated scales to assess adult
549 decisional balance to eat more fruits and vegetables. *Appetite*. 2010;55:454–65.
- 550 25. MacQueen KM, McLellan E, Kay K, Milstein B. Codebook Development for Team-Based
551 Qualitative Analysis. *Field Methods*. 1998;10:31–6.
- 552 26. Anderson E. The Cosmopolitan Canopy. *Ann. Am. Acad. Pol. Soc. Sci*. 2004;595:14–31.

- 553 27. Kelly S, Martin S, Kuhn I, Cowan A, Brayne C, Lafortune L. Barriers and Facilitators to the
554 Uptake and Maintenance of Healthy Behaviours by People at Mid-Life: A Rapid Systematic
555 Review. PLoS ONE. 2016;11:e0145074.
- 556 28. Gittelsohn J, Song H-J, Suratkar S, Kumar MB, Henry EG, Sharma S, et al. An Urban Food
557 Store Intervention Positively Affects Food-Related Psychosocial Variables and Food Behaviors.
558 Health Educ. Behav. [Internet]. 2009 [cited 2015 Nov 28]; Available from:
559 <http://heb.sagepub.com/content/early/2009/11/03/1090198109343886>
- 560 29. Gittelsohn J, Lee K. Integrating Educational, Environmental, and Behavioral Economic
561 Strategies May Improve the Effectiveness of Obesity Interventions. Appl. Econ. Perspect. Policy.
562 2013;35:52–68.
- 563 30. Phipps EJ, Kumanyika SK, Stites SD, Singletary SB, Cooblall C, DiSantis KI. Buying Food
564 on Sale: A Mixed Methods Study With Shoppers at an Urban Supermarket, Philadelphia,
565 Pennsylvania, 2010–2012. Prev. Chronic. Dis. [Internet]. 2014 [cited 2015 Nov 28];11.
566 Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4157594/>
- 567 31. Phipps EJ, Braitman LE, Stites SD, Singletary SB, Wallace SL, Hunt L, et al. Impact of a
568 Rewards-Based Incentive Program on Promoting Fruit and Vegetable Purchases. Am. J. Public
569 Health. 2014;105:166–72.
- 570 32. Foster GD, Karpyn A, Wojtanowski AC, Davis E, Weiss S, Brensinger C, et al. Placement
571 and promotion strategies to increase sales of healthier products in supermarkets in low-income,
572 ethnically diverse neighborhoods: a randomized controlled trial. Am. J. Clin. Nutr.
573 2014;99:1359–68.
- 574 33. Cohen DA, Lesser LI. Obesity prevention at the point of purchase. Obes. Rev. 2016;Epub
575 ahead of print.
- 576 34. Milliron B-J, Woolf K, Appelhans BM. A Point-of-Purchase Intervention Featuring In-
577 Person Supermarket Education Affects Healthful Food Purchases. J. Nutr. Educ. Behav.
578 2012;44:225–32.
- 579 35. Story M, Kaphingst KM, Robinson-O'Brien R, Glanz K. Creating Healthy Food and Eating
580 Environments: Policy and Environmental Approaches. Annu. Rev. Public Health. 2008;29:253–
581 72.
- 582 36. Galizzi MM. What Is Really Behavioral in Behavioral Health Policy? And Does It Work?
583 Appl. Econ. Perspect. Policy. 2014;ppt036.
- 584 37. Thaler RH, Sunstein CR. Libertarian paternalism. Am. Econ. Rev. 2003;93:175.
- 585 38. Prevention Magazine Research Department, Food Marketing Institute Research Department,,
586 Rodale. Shopping for Health 2013 [Internet]. 2013. Available from:
587 [http://www.fmi.org/docs/default-source/2012-health-wellness-conference-](http://www.fmi.org/docs/default-source/2012-health-wellness-conference-presentations/shopping-for-health-2013.pdf?sfvrsn=2)
588 [presentations/shopping-for-health-2013.pdf?sfvrsn=2](http://www.fmi.org/docs/default-source/2012-health-wellness-conference-presentations/shopping-for-health-2013.pdf?sfvrsn=2)

