Using marketing research concepts to investigate specialty selection by medical students

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OBJECTIVES This study was intended to examine whether a marketing research approach improves understanding of medical specialty selection by medical students. This approach likens students to consumers who are deciding whether or not to purchase a product (specialty). This approach proposes that when consumers’ criteria match their perceptions of a product’s features, the likelihood that they will purchase it (select the specialty) increases. This study examines whether exploring students’ selection criteria and perceptions of various specialties provides additional insights into the selection process.

METHODS Using a consumer behaviour model as a framework, a questionnaire was designed and administered to Year 6 (final-year) students in 2008 and 2009 to elicit information on their knowledge about and interests in various specialties, the criteria they used in specialty selection, and their perceptions of six specialties.

RESULTS A total of 132 (67%) questionnaires were returned. In many instances, consistency between selection criteria and perceptions of a specialty was accompanied by interest in pursuing the specialty. Exceptions were noted and pointed to areas requiring additional research. For example, although >70% of female students replied that the affordance of a controllable lifestyle was an important selection criterion, many were interested in obstetrics and gynaecology despite the fact that it was not perceived as providing a controllable lifestyle. Minimal overlap among students reporting interest in primary specialties that possess similar characteristics (e.g. paediatrics and family medicine) demonstrated the need to target marketing (recruitment) efforts for each specialty individually.

CONCLUSIONS Using marketing research concepts to examine medical specialty selection may precipitate a conceptual shift among health care leaders which acknowledges that, to attract students, specialties must meet students’ selection criteria. Moreover, if consumers (students) deem a product (specialty) unattractive, it may need to be examined further to improve its appeal.
INTRODUCTION

The selection of medical specialties by medical students greatly impacts on the future functioning of health care systems by influencing the composition of the doctor workforce. Speciality selection is an ongoing process during medical school, in which definitive choices are often consummated in the final year or during the subsequent internship year. The process involves the student deciding upon his or her selection criteria, collecting information about the various specialties, and then deciding which specialty bests fits his or her criteria. This selection procedure is akin to a consumer–product interaction in that the student acts as a consumer who is deciding whether or not to purchase a specific product (i.e. medical specialty). If the consumer’s criteria, needs and expectations match the product’s features, the likelihood that he or she will purchase it increases. Alternatively, a consumer will generally not buy a product when the reverse is true. Therefore, marketing research, the systematic assembling, recording and analysis of information related to the marketing of products and services, can provide methodological foundations for the study of the specialty selection process. This approach should complement the many previous investigations exploring the process of choosing a medical specialty.

We performed a study using data collected from Year 6 (final-year) medical students to examine the utility of simultaneously exploring medical students’ selection criteria and their perceptions of the various specialties. The study was intended to: (i) explore the psychometric properties of this methodological approach; (ii) investigate whether this approach adds insight into the dynamics of the selection process, and (iii) evaluate the method’s limitations.

METHODS

Study design

We designed a cross-sectional study to examine whether it was suitable to use principles of consumer decision process research as guidelines when exploring the selection of medical specialties by medical students. Among the methods we used as guidelines was the AIUAPR (awareness, interest, understanding, attitudes, purchase and repeat purchase) consumer behaviour model. The AIUAPR and other models were used in the design of a questionnaire intended to collect information from Year 6 medical students about the (two-sided) selection process.

Questionnaires

The initial three sections of the questionnaire (Appendix S1, online) elicited information on the nature of the students’ selection criteria. These sections examined: the respondent’s awareness (i.e. knowledge) of the characteristics (daily activities, lifestyle, remuneration, etc.) of 19 specialties (Section A); the respondent’s degree of interest in pursuing each of these specialties as a career (Section B), and the respondent’s understanding of how each of 25 criteria influences the choice of a medical specialty (Section C).

The subsequent two sections (Appendix S1) explored the other side of the equation by focusing on perceptions of and interest in the various specialties to ascertain: the respondent’s attitudes (perceptions) towards (17 items) a group of selected specialties (Section D), and the respondent’s level of consideration of pursuing a career in each of these specialties (purchase) (Section E). Some of the variables in Sections C and D were similar in order to permit comparisons between selection criteria and perceptions (Appendix S1). A 5-point Likert scale was used to answer questions. An additional section gathered demographic information.

Pilot study

Prior to its use in the present study, the questionnaire was utilised in two small, consecutive, preliminary studies involving 15 students each, which were intended to identify any difficulties and problems with the questionnaire. The major difficulty recognised during the preliminary studies was that it was necessary to limit the number of selected medical specialties in Sections D and E because 17 items were queried for each specialty. Specifically, when information was elicited on 10 medical specialties, many of the respondents failed to answer all the questions because of the excessive time (approximately 30–35 minutes) required to complete the questionnaire. Therefore, the final version of the questionnaire included just six specialties. These included four specialties that mirrored those practised by the investigators (family medicine,
obstetrics and gynaecology, orthopaedic surgery, anaesthesiology) plus paediatrics and general surgery. This provided information on two primary care specialties (paediatrics and family practice) and two surgical specialties (general and orthopaedic surgery), plus obstetrics and gynaecology, and anaesthesiology. This shorter version could be completed in approximately 15–20 minutes.

**Study procedure**

The final questionnaire was distributed to two consecutive Year 6 (final-year) medical school classes in the years 2008 and 2009 at the Hebrew University Hadassah School of Medicine during each class’s final period of coursework. The questionnaires were collected during the final 2 weeks of the course and daily reminders were given out.

**Data management and analysis**

We entered the data into Microsoft Excel spreadsheets and analysed the data using SYSTAT Version 12.0 (Systat Software, Inc., San Jose, CA, USA). All points on the 5-point scale were utilised in statistical analysis. When presented as categorical data, these data were compressed into three ordinal categories (respectively: the two points representing negative tendencies; the middle point, and the two points representing positive tendencies). The proportions (percentages) of total responses for each of the three categories were then computed.

Based on previous medical education and marketing studies, an *a priori* decision was made to separately analyse the responses of male and female students and to compare the responses of these groups. Two-tailed paired Student’s *t*-tests were used to determine inter-gender differences. A *p*-value of < 0.05 was considered to indicate statistical significance.

The initial group of analyses examined the methods. Internal consistency was explored by examining relationships among different sections of the questionnaire.

1. Cronbach’s alpha statistic was used to investigate the concordance between interest in (Section B) and level of consideration of pursuing a career in each of the selected specialties (Section E).
2. Multivariate regression analyses were used to examine the relationships between the degrees of interest in (Section B) and selection criteria (Section C) applied to each of the selected specialties. Multivariate regression analysis was also used to compare the relationships between the level of consideration given to pursuing a career in each of the selected specialties (Section E) as dependent variables and the selection criterion (Section C) as an independent variable. These relationships are reported as the regression coefficient (*r*).

The subsequent group of analyses identified areas in which the methods provided unique insights into the selection process.

3. Paired (for same-gender comparisons) and unpaired (for inter-gender comparisons) *t*-tests, as well as linear regression analysis were used to compare the replies to queries about knowledge of (Section A) and interest in (Section B) the selected specialties.
4. Graphs and linear regression analysis were used to compare both sides of the selection equation. The selection criteria (Section C) were compared with both perceptions of the same and similar characteristics of the selected specialties (Section D) and with the level of consideration given to pursuing a career in each of the selected specialties (Section E).
5. The overlap between interests in the selected specialties was examined using the data from Sections B and E, specifically pertaining to the number of women who expressed interest in both family medicine and paediatrics, and the number of men who expressed interest in both orthopaedic and general surgery.
6. Perception profiles were shown using graphs (Sections D and E) of the selected specialties.

**Ethical considerations**

Completion of the questionnaires was voluntary. This study was approved by the Hadassah Medical Organization Institutional Review Board.

**RESULTS**

This study was not designed to analyse in detail the medical students’ selection process, nor their perceptions of the various specialties.

A total of 132 (67%) of 197 questionnaires were returned (2008: 64 of 100 [64%]; 2009: 68 of 97 [70%]). Overall, 50% of the students were female and 44% of the male students and 46% of the female students were married.
The results are presented in the sequence enumerated in the data management and analysis section.

1 Internal consistency was demonstrated by good concordance between the degree of positive consideration (Section E of the questionnaire, Appendix S1) and the students’ interest in (Section C) each of the six specialties. Cronbach’s alphas ranged from 0.78 to 0.92. The greater the positive consideration and interest, the greater was the concordance (Table 1).

2 Internal consistency was also shown by the moderate to close relationships ($r$ ranged from 0.48 to 0.81) between the 25 selection criteria (Section C) and interest (Section B) in each of the six selected specialties, and the 25 selection criteria (Section C) and positive consideration (Section E) (Table S1, online).

The marketing research-based methods provided many insights into the students’ selection process.

3 Significantly more men than women self-reported that they were knowledgeable about activities, remuneration and lifestyles (Section A) associated with each of the six selected specialties (Table 1). There were also significant differences between the genders in their interest in pursuing careers in these specialties (Section B) (Table 1).

4 A comparison of selection criteria (Section C) deemed important by medical students who had collected similar information on the selected specialties (Section D) indicated that multiple factors appeared to be influential (Figs 1 and 2). The graphs show that multiple factors influence the decision process and the mix of factors appears to be specialty-specific. For example, over 90% of female students actively considered that the specialty should be ‘interesting and challenging’ as an important criterion in selecting a specialty (Section C). In Section D, students were asked to rate each of the six specialties as ‘interesting and challenging’ and, in a separate item, as ‘boring’. Fig. 1a shows that although a specialty was considered interesting, it did not mean it was considered positively overall or individually ($r = 0.58$). Alternatively, family medicine, which was reported by many students as uninteresting and by quite a few as boring, was found to be under positive consideration by 28% of students. This suggests that the way in which students use their criteria in selection is not straightforward. Male medical students were more definitive. The specialties they considered ‘interesting and challenging’ (e.g. general and orthopaedic surgery) were more often positively considered ($r = 0.90$), whereas those deemed ‘boring’ by male students (e.g. paediatrics and family medicine) were not considered (Fig. 1b).

Female medical students more often rated a ‘controllable lifestyle’ rather than a ‘high salary’ as an important selection criterion (Section C). Paediatrics and family medicine, which were positively considered by 28% and 43% of students, respectively, were perceived as providing a controllable lifestyle and affording a reasonable relationship between lifestyle and income (Section D). However, obstetrics and gynaecology, which was not perceived as offering a controllable lifestyle, but was seen as providing a high salary, was positively considered by a third of students. This demonstrates the complexity of the selection process, which involved some other variables that were not included in the study questionnaire (Fig. 2a). Male medical students rated ‘controllable lifestyle’ and ‘high salary’ as equally important as selection criteria (Section C), but analysis showed that the specialties perceived (Section D) as providing high salaries were each positively considered by more than a quarter of respondents, despite the fact that they were not perceived as affording a controllable lifestyle. The paradox was general surgery, which was positively considered by 36% of respondents despite being perceived by all respondents as providing neither a controllable lifestyle nor a reasonable relationship between lifestyle and income, and by only a few as affording a high salary. Family medicine and paediatrics were not positively considered by many male medical students (Section E) despite being perceived as providing a reasonable relationship between lifestyle and income as a result of a controllable lifestyle. They were, however, not perceived as highly financially rewarding (Fig. 2b).

Male and female students differed considerably ($p < 0.002$) in the importance they placed on prestige as a selection criterion (Fig. S1, online). Only about 5% of female medical students rated prestige ‘in the view of colleagues’ or ‘in the view of the population’ as important selection criteria (Section C). This was reflected by the lack of relationships between women’s perceptions (Section D) of the six specialties as prestigious ‘in the view of colleagues’ ($r = 0.08$) or ‘in the view of the population’ ($r = 0.14$) and their positive consideration of these specialties (Section E). About 25% of male medical students rated the prestige of the specialty ‘in the view of colleagues’ or ‘in the view of the population’ as important selection criteria (Section C). This was further reflected in the strong relationships between male students’
perceptions (Section D) of the six specialties as prestigious ‘in the view of colleagues’ \( (r = 0.92) \) or ‘in the view of the population’ \( (r = 0.93) \) and their positive consideration of these specialties (Section E).

In total, 22 women expressed interest (Section B) in paediatrics and 27 in family medicine, with 11 expressing interest in both. In Section D, 18 women reported that they were positively considering paediatrics and 26 stated they were positively considering family medicine; only six were considering both. Among the men, 20 expressed interest (Section B) in general surgery and 19 in orthopaedic surgery, and nine were interested in both. Also among the men, 20 were positively considering (Section D) general surgery and 17 were considering orthopaedic surgery; six were considering both.

Graphing perception profiles provides a useful way to compare specialties. For example, unlike orthopaedics, paediatrics was considered by many female students. Paediatrics was perceived as more interesting and less boring, and as permitting a controllable lifestyle and allowing for family time and the possibility of working limited hours. Although remuneration was perceived as low, paediatrics was perceived as facilitating a reasonable relationship between lifestyle and income (Fig. 3).

### Table 1

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Knowledge, % (Section A)</th>
<th>Interest, % (Section B)</th>
<th>Positive consideration, % (Section E)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td>Men*</td>
<td>Women</td>
</tr>
<tr>
<td>General surgery</td>
<td>35</td>
<td>55(^*)</td>
<td>20</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>50</td>
<td>56</td>
<td>37</td>
</tr>
<tr>
<td>Orthopaedic surgery</td>
<td>8</td>
<td>32(^*)</td>
<td>8</td>
</tr>
<tr>
<td>Anaesthesiology</td>
<td>12</td>
<td>32(^*)</td>
<td>5</td>
</tr>
<tr>
<td>Obstetrics and gynaecology</td>
<td>43</td>
<td>50</td>
<td>31</td>
</tr>
<tr>
<td>Family medicine</td>
<td>42</td>
<td>50(^\dagger)</td>
<td>26</td>
</tr>
</tbody>
</table>

\( r^2 \) 0.89 0.03 0.05

Values are sums of the two positive points (much and very much) on the 5-point Likert scale

\(^*\) p < 0.008 versus women (overall)

\(^\dagger\) p < 0.05 versus women

\(^\ddagger\) Positive consideration: values in parenthesis are Cronbach’s alpha statistics for the concordance between interest and positive consideration

\(^§\) Correlations between women and men

5 In total, 22 women expressed interest (Section B) in paediatrics and 27 in family medicine, with 11 expressing interest in both. In Section D, 18 women reported that they were positively considering paediatrics and 26 stated they were positively considering family medicine; only six were considering both. Among the men, 20 expressed interest (Section B) in general surgery and 19 in orthopaedic surgery, and nine were interested in both. Also among the men, 20 were positively considering (Section D) general surgery and 17 were considering orthopaedic surgery; six were considering both.

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**DISCUSSION**

The precepts of marketing research provided a framework with which to explore the process medical students use to select specialties for residencies and careers. These methods performed well, as demonstrated by the internal consistency established between the data collected on both sides of the selection equation (i.e. how the students’ selection criteria matched their perceptions of various specialties), such as, for example, the excellent concordances between students’ degree of interest in and positive consideration of specific specialties. This consistency in students’ preferences among the various specialties provides a stable basis for the generation of hypotheses concerning how specialties are selected. In addition, these methods facilitated understanding of the criteria important to students in their process of deciding on career specialties and the roles these factors may play when students assess their perceptions of the various specialties. There were, however, instances when there was little or no consistency between the two sides of the equation, which provide valuable insights into areas needing further investigation. For example, further investigation is required to determine why female medical students were drawn to obstetrics and gynaecology despite their perceptions of it as a specialty that does...
not allow for a controllable lifestyle. Similar observations concerning obstetrics and gynaecology have been made by other investigators\(^14,15\). Whether this lack of consistency arose from methodological issues or the need to identify additional factors that are operative during the selection process (and were not included among the items on the questionnaire) should be explored in future studies.

The dual-sided approach (i.e. how students’ selection criteria match their perceptions of various specialties) also demonstrated how general criteria important to students when deciding on career specialties were then used in the students’ positive or negative consideration of various specialties. This information thus identified factors associated with the students’ poor perceptions of individual specialties, such as anaesthesiology and general surgery. For example, neither male nor female respondents perceived anaesthesiology as providing a controllable lifestyle or a high salary, both of which emerged as important selection criteria. Therefore, investigations using marketing research principles promise to provide information on whether and where to change both perceptions and realities to make specialties more marketable. Alternatively, such studies can provide information on why other specialties are positively perceived, which should help to direct efforts aimed at maintaining this attractiveness. This approach, which measures how customers feel about a product and then uses these data to improve the product, is the essence of marketing research.

When using a trans-disciplinary approach, it is important to recognise the differences between the types of problems encountered by the originating discipline (consumer-product marketing) and those of the recipient discipline (selecting a medical specialty). Marketing research concerns the purchasing of ser-
services and products, which involves the outlay of money, whereas career decisions involve choices that concern livelihoods and income levels. Both decision processes include many of the same steps and thus frameworks such as the AIUAPR model are helpful in studying medical specialty selection. Marketing research is performed either on an entirely new product, which involves convincing customers that they really need the product, or on an existing product. 16 Research that pertains to an existing product is aimed at improving either or both the marketing approach or the product itself in order to attract additional customers or penetrate additional markets.17 This situation is akin to that of choosing a medical specialty, in which medical students must select among a large number of existing specialties, all of which are competing to attract resident applications. In such a situation, marketing focuses on how consumer perceptions of the various products differ and how these differences can be exploited to convince the consumer to consider (and acquire) a particular product. For example, in the present study many male students were attracted to procedural or surgical specialties, but they perceived orthopaedic surgery differently to general surgery. These differences appeared to reflect their perception that general surgery affords less equilibrium between controllable lifestyle and remuneration, both of which are important selection criteria for male medical students, than orthopaedic surgery. These differences between the two specialties provided insight into why one specialty is popular and the other has problems in recruiting residents. These results should lead leaders in general surgery to explore ways of improving their ‘product’ to increase its attractiveness.

Other frequent goals of marketing research include the defining of a target population (i.e. the population most likely to buy the product), the ascertaining of why other groups are not interested and the determination of what might make these groups interested. For instance, the current study showed that, although many female medical students were attracted to family medicine and paediatrics, respectively (as demonstrated in both Sections B and E of the questionnaire), these students largely represented two separate groups with only some overlap. Similarly, male medical students with interests in orthopaedic and general surgery, respectively (Sections B and E), represented two separate groups, with some, but not total, overlap between them. From these observations, it would seem appropriate to employ separate marketing strategies to attract students to each of these specialties: it is not sufficient to attract male medical students to surgery as a generic field; instead, it is necessary to market general and orthopaedic surgery separately. Similarly, with female medical students, it is necessary to employ different strategies to attract students to paediatrics and family medicine, respectively.

There was generally internal consistency between the two sides of the equation. This was shown by the high concordance between responses to general queries about degrees of interest in the respective specialties and more focused questions on positive consideration of the six specific medical specialties (Table 1). It might be expected that more students would answer positively or negatively to the general questions than to the focused items. As the high level of concordance between the degree of positive interest and positive consideration of the various specialties shows, this did not occur. This consistency was unexpected, but probably indicates that, at this point in their careers, many students have a clear sense of direction about their future medical specialty. This observation may be important as it may
conclusions

The doctor workforce represents the backbone of a health care system. We present another way of investigating how medical students select medical specialties by viewing the selection process as a shopping expedition. An advantage of this approach is that it highlights to department chairs, health care leaders and residency programme directors their need to be cognisant of how medical students perceive specialties. Moreover, our concept of students as consumers seeking a product to their liking should cause a paradigm shift among the health care leadership. Specifically, the leadership needs to market specialties and, if necessary, change them to make them more appealing. It is difficult in the free market to sell products that are deemed by consumers as unattractive; such products are generally either withdrawn from the market or modified to meet consumers’ expectations. Failure to effectively market unattractive specialties may result in an imbalance of specialists, thereby handicapping the health care system.
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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article.

Figure S1. (a) Females (n = 66): prestige versus perceptions of medical specialties. (b) Males (n = 66): prestige versus perceptions of medical specialties.

Table S1. Overall relationships among the 25 selection criteria and interest in and positive consideration of the six selected specialties: differences between male and female students (n = 132).

Appendix S1. Study questionnaire.

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