SELECTION TO COFFEE DRINKING BY HEALTH—WHO BECOMES AN ADOLESCENT COFFEE DRinker?1

ELINA HEMMINKI, OSSI RAHKONEN, AND MATTI RIMPELA

The results of studies on the health effects of coffee or of caffeine are conflicting. Some suggest that those drinking much coffee have a poorer health prognosis, but others report no additional health problems (1-3). Evaluating the health effects of coffee involves many methodological problems. The purpose of this study was to investigate one of them—exposure selection by health status (4). Because coffee drinking starts at an early age, selection to it was studied among young people.

SUBJECTS AND METHODS

We used data from the Finnish Juvenile Health Habit Study, an ongoing survey of the health habits of representative samples of Finnish youth (5). In this follow-up study, a sample of 1,137 12-year-old Finns (born in 1966) was followed for six years (1979-1985). Every two years, information about their health and health habits was gathered by mailed questionnaires. Each year, the questionnaire was sent to the whole sample. The 832 children (73 percent of the original sample of 12-year-old children) who had answered at least the 14- and 18-year questionnaires constitute the study subjects. The health of the persons who answered the 14-year questionnaire but did not answer the 16- and 18-year questionnaires was similar to the health of those included in this study. Those who did not respond to the 14-year questionnaire but who responded to the 16- and/or 18-year questionnaire drank less coffee than those who answered all questionnaires.

This suggests that the dropouts of the study drank less coffee than those in the study (5).

The question about coffee consumption was the same in all surveys: “How many cups of coffee, tea, or hot chocolate do you drink in a day? Answer every item separately.” Two alternatives were given for each beverage: “I do not drink daily” and “I drink about . . . cups.”

The health of the children was estimated from the 14-year questionnaire, because the health data in the 12-year questionnaire was meager. Three different indicators of health were used; based on each indicator, the children were classified into the best, middle, or worst category of health. For each class, we tried to get similar numbers of children.

Perceived health and physical condition

Questions on overall health (“Do you consider your present health to be . . .”) and physical condition (“Do you consider your present physical condition to be . . .”), both offering ready alternatives for answers, were combined. The best category of health included children who had answered “very good” to the first question and “very good” or “fairly good” to the second question. The middle category included those answering “fairly good” to the first question and “very good, fairly good, or average” to the second question, or “very good” to the first question and “average” to the second question. The rest of the children with different combinations of “average,” “rather poor,” and “poor” alternatives were classified into the worst health category.

Perceived health

Only the question on overall health was used, and children choosing the first alter-
native were classified into the best, those choosing the second into the middle, and the rest into the worst category of health.

Symptom index

A list offered 18 symptoms, such as headache, irritability, and stomach pain (6), with four alternative answers for each. A summary index of these symptoms was computed by giving weights to each alternative (1 = never or seldom, 2 = sometimes, 3 = quite often, 4 = often or continuously), calculating a sum, and subtracting 17 from it, to give a range from 1 to 55. Children having a sum from 1 to 3 were classified into the best category, those having a sum from 4 to 8 into the middle, and those having a sum higher than 8 into the worst category of health.

Analysis

When coffee consumption by health was studied, sex and school type (professional = in a high school, college, or university at age 18 years; vocational = all others) were considered as confounding factors. Males drank more coffee than females. The average number of cups of coffee consumed by males at ages 12, 14, 16, and 18 years were 1.3, 1.7, 2.3, and 2.9, respectively; for females of the same ages, the averages were 1.0, 1.4, 1.9, and 2.2, respectively. Among both sexes, children in the vocational type school drank more than those in the professional type. On the other hand, females overall or both sexes in the vocational type school reported more health problems than did males overall or both sexes in the professional type school.

All analyses were first made separately for sex and school type. Then, sex- and school-type-adjusted means for daily cups of coffee consumed were calculated by analysis of variance (SPSS statistical package (7)). Because of limited space, the sex- and school-type-specific results are described in the Results only for major exceptions from the adjusted means.

Farmers' children drank more coffee than children of those who were not farmers (5). Although their health status was similar to that of non-farmers' children, analyses were done both by including and excluding farmers' children. Since the results were similar in both cases, only results including farmers' children will be given.

RESULTS

Children who had poorer health at age 14 years drank more coffee when they were 18 years of age than children who had better health (table 1). Only children who did not drink coffee at age 14 were included in table 1 because coffee consumption may have influenced our health indicators, especially the symptom index. This trend of higher coffee consumption with poorer health appeared with all our health indicators, but more strongly with the symptom index.

When all children, including those who drank coffee at age 14 years, were considered, similar but somewhat smaller differences by health status were found. The overall level of coffee consumption was much higher.

The increase in coffee consumption from age 12 to age 18 was larger for children with poorer health (measured at age 14 years) when the two indicators of perceived health were used (table 2). For the symptom index, the differences were smaller. In the sex- and school-type-specific analyses, both females and males in the professional type school had the largest increase in the category of the average symptom index.

DISCUSSION

Our results suggest that children with poorer health select themselves to higher coffee consumption than children with better health ("sick drinker effect"). Thus, some of the additional health problems of heavy coffee drinkers may result from the selection of people with poor health to coffee consumption. The selection may result from two mechanisms. First, poor health as such may increase coffee consumption, e.g., drinkers seek coffee's alleviating effects. Second, and more likely, there is no causal link; children with poorer health drink more coffee for reasons other than health,
Coffee consumption (mean cups per day) at age 18 years, by different health indicators measured at age 14 years*

<table>
<thead>
<tr>
<th>Health indicator</th>
<th>Health category at age 14 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived health and physical condition</td>
<td>Best (113) Middle (216) Worst (78)</td>
</tr>
<tr>
<td>Perceived health</td>
<td>0.97 (136) 1.3 (207) 1.3 (64)</td>
</tr>
<tr>
<td>Symptom index</td>
<td>0.77 (116) 1.3 (171) 1.5 (116)</td>
</tr>
</tbody>
</table>

* Adjusted for sex and school type by analysis of variance. Only nondrinkers at age 14 years are included. Numbers of children are given in parentheses.

Increase in coffee consumption (mean cups per day) from age 12 to age 18 years, by different health indicators measured at age 14 years*

<table>
<thead>
<tr>
<th>Health indicator</th>
<th>Health category at age 14 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived health and physical condition</td>
<td>Best (209) Middle (398) Worst (164)</td>
</tr>
<tr>
<td>Perceived health</td>
<td>1.2 (261) 1.3 (373) 1.7 (138)</td>
</tr>
<tr>
<td>Symptom index</td>
<td>1.2 (223) 1.5 (333) 1.4 (209)</td>
</tr>
</tbody>
</table>

* Adjusted for sex and school type by analysis of variance. Numbers of children are given in parentheses.

as a part of their overall health behavior.

We did not find earlier studies that showed poor health as a risk factor associated with coffee consumption. Cross-sectional studies have suggested lower autonomic arousal, higher anxiety, and higher prevalence of Type A personalities among coffee drinkers than among other groups (8-10). However, cross-sectional studies on the relations between anxiety and coffee drinking are difficult to interpret because it is not known which is cause and which is effect.

If coffee negatively influences health, an opposite selection is later possible: In occupational health research, "the healthy worker effect," that is, only healthy workers can stay long in unhealthy occupations, is well known. Likewise, it may be that in the long term, only persons with good health and good resistance to coffee’s possible harmful effects can drink high amounts of this beverage. Such selection would be important to study among adults of different ages.

REFERENCES