Variables of Consultation Experience Influencing Orthodontic Treatment Plan Acceptance

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Abstract:

Conversion rate from consultation to treatment start is an important practice management metric for orthodontists. Much is unknown about what influences treatment plan acceptance. This study aimed to determine whether non-clinical, non-financial factors including demographics, leadership / marketing / communication skills, and character / behavioral traits of orthodontists influence conversion rate. A paired questionnaire was formulated: one for practicing orthodontists, one for orthodontic patients, including questions regarding demographics, consultation experience, higher education, work experience, orthodontic business, and behavioral traits. Relationships between reported conversion rates and the other responses were analyzed. Among other conclusions, the study found statistically significant lower conversion rates for Asian orthodontists and urban orthodontists, that business, marketing, communications, or related courses in continuing education do not improve conversion rate, digital visual aids seem to improve conversion rates, and that the number of languages spoken by an orthodontist is correlated to higher conversion rate. Further research is indicated to elucidate these and other findings.

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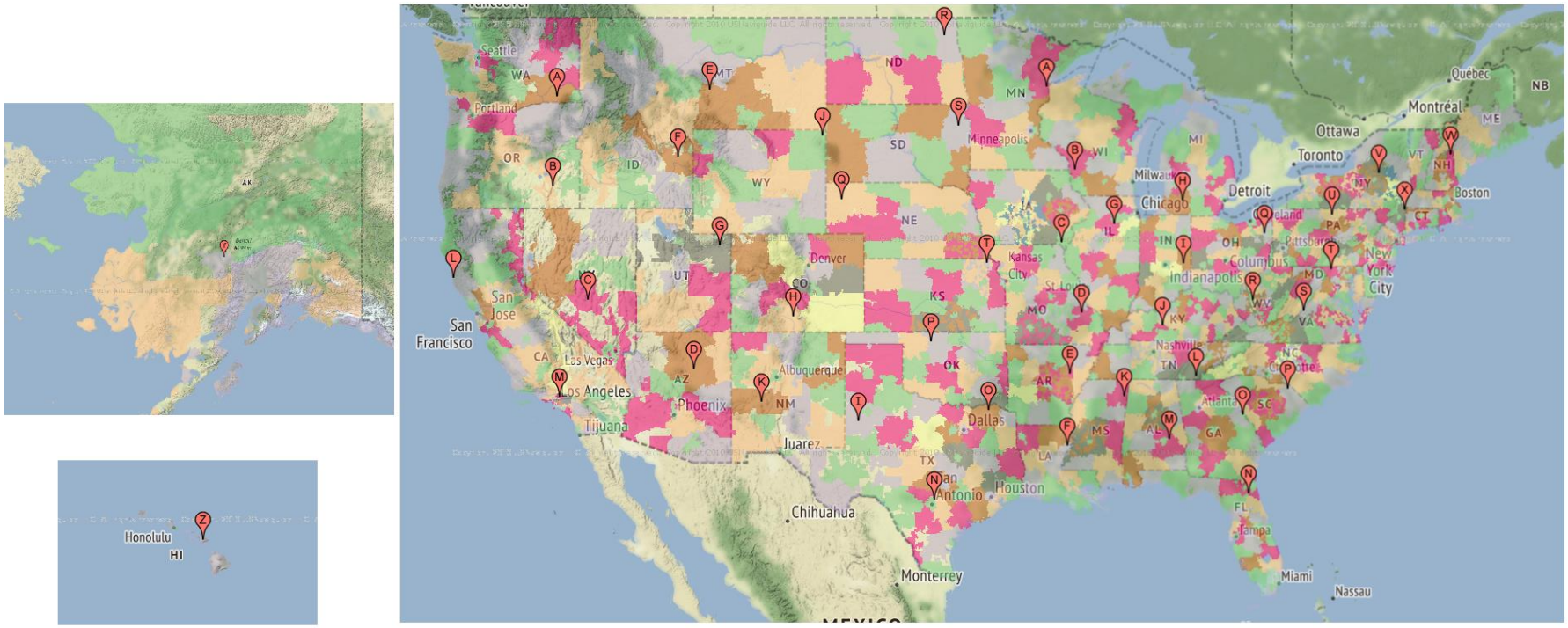

Tables

Table 1: U.S. Zip Codes Used for Orthodontist Contact List

66434	**87825**	**97721**	**44401**	**49037**
57263	**82710**	**99361**	**29512**	**61350**
58270	**79316**	**12546**	**30909**	**71357**
69348	**81146**	**03845**	**32043**	**72101**
73726	**84078**	**13324**	**36075**	**63601**
75462	**83445**	**16901**	**37369**	**52625**
78266	**59085**	**21788**	**38843**	**54665**
91023	**86035**	**22958**	**42207**	**55797**
95427	**89049**	**25311**	**47327**	**99691**
				96790

Orthodontist survey

Table 2: Ethnicity / Race

Answer	%	Count
White	82.81%	419
Black or African American	1.98%	10
American Indian or Alaska Native	0.00%	0
Hispanic	2.17%	11
Asian	7.91%	40
Native Hawaiian or Pacific Islander	0.00%	0
More than one race (please describe)	1.58%	8
other (please describe)	3.56%	18
Total	100%	506

Table 3: Gender

Answer	%	Count
Female	27.52%	139
Male	72.28%	365
Prefer to self-describe	0.20%	1
Total	100%	505

Table 4: Practice Type

Private practice - owner	47.59%	385
Private practice - associate	31.15%	252
Corporate practice	13.10%	106
Other	8.16%	66

Table 5: Practice Setting

Urban	22.20%	101
Suburban	66.15%	301
Rural	11.21%	51
Frontier	0.44%	2

Table 6: Board Certification

Yes.	45.59%	207
I am scheduled to complete my board examinations.	5.51%	25
No.	48.90%	222

Table 7: Decision Aid Use

Yes	53.40%	228
No	11.01%	47
What is a Patient Decision Aid?	35.60%	152

Table 8: Willingness to Compromise

I do not waver once I have communicated my opinion to a patient.	2.80%	12
I am open to small treatment compromises if the overall outcome isn't compromised.	69.86%	299
I am open to treatment compromises if they make the patient happy.	27.34%	117

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Introduction

Background:

Orthodontics is one of the few healthcare professions that usually provides free consultations to patients. Different patients exhibit highly variable responses to a given type of treatment plan. A catch-all explanation is "personal preferences," but could there be consistent factors that positively or detrimentally influence likelihood of patients to accept a treatment plan? Is it all how the plan is pitched? Do patients hold biases or preferences towards providers displaying certain behavioral or demographic characteristics that influence trust in, and therefore acceptance of, a treatment plan, regardless of what the plan is? Patients often seek multiple opinions before committing to treatment at a given office. Conversion rates comparing consultations to treatment starts are a common business evaluation tool for orthodontic offices. If these rates were collected and evaluated in the context of the demographics, leadership/marketing/communication skills, and character/behavioral traits of orthodontic practitioners, an association may be found that could inform treatment presentation optimization at orthodontic consultation to improve conversion rates at orthodontic offices.

Aims:

This study aims to determine whether non-clinical, non-financial factors including demographics, leadership / marketing / communication skills, and character / behavioral traits

of orthodontic practitioners correlate with patients' decisions to start treatment with a given provider.

The null hypothesis to be tested is that the above listed factors do not influence orthodontic treatment plan acceptance.

Materials and Methods

The study was reviewed and approved by the OHSU Institutional Review Board, study #21177 (Appendix F). A pilot of the orthodontist survey was completed by two orthodontic faculty at OHSU for input on the survey questions and the experience of taking the survey such as duration and logistical problems. The survey took approximately 10-15 minutes and no there were no logistical issues.

Survey Development:

There was not an existing validated survey designed to compare orthodontic patient data and orthodontist data to orthodontist conversion rates. However, a paired questionnaire format for providers and patients had recently successfully been utilized for quality improvement of patient scans in echocardiography.[1] This format was adapted and a paired questionnaire was formulated: one for practicing orthodontists, one for orthodontic patients / the signers for consent for orthodontic treatment if the patient was too young to sign for their own treatment. An information sheet was posted at the beginning of each survey. The patient survey included blocks of “Demographics” and “Consultation Experience” questions. It also asked the name of the orthodontist whose office they had visited. This allowed the patient and orthodontist answers to be paired yet remain anonymous from each other. The orthodontist survey included blocks of “Demographics,” “Higher Education,” “Work Experience,” “Orthodontic Business,” and “Behavioral Traits” questions.

"Demographics" questions were written to identify potential demographical biases such as gender, age, racial, and cultural biases. They were included because no existing surveys had collected this information in the context of conversion rates.

"Consultation Experience" questions were written to assess the influence of various variables on treatment plan acceptance: time spent with a patient, successful patient involvement, patient perception of their orthodontist, patients' overall feelings after their consultation, office atmosphere, patient orthodontic IQ, cost of treatment. They were included because there had been published surveys on patient satisfaction after consultation experiences in medicine for general practitioners and physician assistants, but not in orthodontics.[2] Second, the influence of time spent with patient on patient satisfaction had been evaluated in a patient survey in medical radiology, but not in orthodontics.[3] Third, the importance of patient involvement in consultations had been stressed in orthodontic literature, but the success of patient involvement in consultations had yet to be measured.[4]

"Higher Education" questions were written to assess the influence of certain coursework on treatment plan acceptance. They were included because no existing surveys had collected this information in the context of conversion rates.

"Work Experience" questions were written to assess influence of orthodontic residencies, modes of practice, locations of practice, certification, and other careers on treatment plan acceptance. They were included because no existing surveys had collected this information in the context of conversion rates.

"Orthodontic Business" questions were written to obtain conversion rates, along with influence of time, orthodontist presence, and use of various decision aids on treatment plan acceptance. They were included, again, because the influence of time spent with patient on patient satisfaction had been evaluated in a patient survey in medical radiology, but not in

orthodontics.[3] Also, the importance of decision aids in consultations had been stressed in literature, orthodontic and otherwise, but their implementation in orthodontic consultations had yet to be measured and had not been evaluated in the context of conversion rates.[3,5–11] "Behavioral Traits" questions were designed to be paired with questions in the patient survey. The responses to the "Behavioral Traits" questions would be compared to the patient perceptions of their orthodontists and identify whether the degree of heterogeneity between the orthodontist and patient responses correlated to treatment plan acceptance. "Behavioral traits" questions were written to assess orthodontist self-awareness, and doctor-patient decision-making tendency on treatment plan acceptance. They were included because while certain character traits have been discussed as beneficial to the orthodontic consultation experience, no existing surveys had collected this information in the context of conversion rates.[4]

See Appendices A, B, C, D, and E for orthodontist and orthodontic patient questionnaires and recruitment E-mails.

Samples / Participants:

The sample of orthodontists was obtained through the membership directory on the AAO member website https://www.aaoinfo.org/d/apps/member-directory-search. The sample of patients was volunteered by the participating orthodontists and consisted of patients who had been consulted for orthodontic treatment on or after 2/1/20.

Formulation of contact lists:

Viewing results in the AAO directory required entering one of two search types: a name, or a city/postal code/address. The city/postal code/address search additionally required a "distance miles" radius selection from a dropdown menu. Regardless of the number of search results, the directory would only display a maximum of the first 1000 results. Only after the 1000 results

were selected by the program would any additional filters be applied. The desired additional filter to be applied was "is practicing," since AAO members not currently practicing would not have conversion rates to report.

To construct a contact list including as many AAO orthodontists as possible, it was desirable that each search result just under 1000 orthodontists. A trial "distance miles" dropdown selection of 1000 miles yielded far more than 1000 orthodontists in the average search. Depending on the zip code, a "distance miles" dropdown selection of 300 miles tended to yield results under 1000 orthodontists except in high orthodontist density areas such as New York City. It was therefore decided to utilize 300 miles as the "distance miles" filter for all except the Alaska zip code, for which 1000 miles was utilized, as this 1000-mile search yielded under 1000 orthodontist results.

Zip codes covering as much of the geographical U.S.A. as possible were identified using the program on the website: http://maps.huge.info/zip.htm. Pins were dropped ~300 miles apart across the U.S. (Figure 1). Most states were represented by one zip code, with the following exceptions: California and Texas, which were represented by two and three zip codes, respectively, due to their large geographic size and orthodontist density, and several states on the east coast that were not represented by a zip code since they were well within a 300 mile radius of zip codes representing other states. 46 Zip codes were identified (Table 1).

A search in the AAO directory was completed for each zip code, with "300" selected from the "Distance Miles" dropdown menu (except the Alaska zip code, for which "1000" was selected), and "Yes" was checked for the "Is Practicing" filter. Results of each search were saved and compiled in an excel document. Duplicates were removed, yielding 8109 contacts. 392 contacts were removed when constructing the email list as these contacts did not include an email address in their AAO directory entry, leaving 7717 contacts for the email list. The orthodontist contacts were divided into 154 contact lists of 50 recipients or less to be emailed at a time. All

154 contact lists were uploaded separately into Qualtrics. The 2017 Orthodontic Workforce Report estimated 10,658 orthodontists were practicing in the U.S.A[5]. Though there are likely more in 2020, the compiled email list would reach approximately 72% of 2017's approximation of practicing U.S.A. orthodontists.

All orthodontists who volunteered patients to be contacted for the patient survey elected to have their office staff forward the survey rather than have the research team contact their patients directly. Office staff contact lists were formulated individually as results from the orthodontist survey came in.

Distribution of Surveys:

Through Qualtrics, emails were timed to distribute an "individual" (unique to each contact) survey link and a recruitment letter (appendix C) to a different contact list approximately every 30 minutes 4/18/20 – 4/23/20 to minimize email going to recipients' spam folder. One respondent requested the survey be sent to a different email address so an additional email was sent to the desired address on 4/26/20. Reminder emails were scheduled and sent two weeks and four weeks later to every contact list, save the respondents who had already responded. The recruitment letter informed participating orthodontists that the survey was a resident research project, and that results would be anonymous. It also informed orthodontists their survey would invite them to elect one of two options to survey their patients consulted on or after 2/1/20 (but doing so would not be mandatory to complete the orthodontist survey).

All orthodontists who volunteered patients to be contacted for the patient survey elected to have their office staff forward the survey rather than have the research team contact their patients directly. A new contact list of office staff was formulated and emailed approximately every two weeks 4/27/20-6/11/20. Each office staff contact list (save the contacts who already responded) was sent reminder emails approximately every two weeks for a total of two

reminder emails. Each time, the office staff was sent two messages, one minute apart. The first message (appendix D) contained an anonymous link to the survey and instructions to forward the contents of second message (appendix E), unchanged, to their patients consulted on or after 2/1/20. The second message contained a recruitment letter addressed directly to the orthodontic patients and a "multiple completes" link so that multiple patients could answer the survey from the same link. Responses from the anonymous links in the first message were distinguishable from responses from the "multiple completes" links so potential orthodontists / staff members opening of their anonymous link would not skew the patient data.

The recruitment email to the orthodontic patients also specified the survey was a resident research project, and their responses would be anonymous.

To encourage answering of all questions, an error message was delivered if questions were left unanswered, but respondents could choose to not answer questions. Respondents were not compensated for responding.

Responses to Inquiries

All communications from respondents were recorded and sorted based on their contents. Each was sent a reply according to their inquiry.

Data Analysis

Qualtrics and IBM SPSS Statistics v. 24 were used for ANOVA chi square tests and analyses of variance. Microsoft Excel was used for regressions and two-tailed T tests. External Fisher's exact test was also used.

Results

There were 557 recorded responses to the orthodontic survey with a 7.22% response rate.

There were 13 responses to the patient survey with an unknown response rate as orthodontic

offices did not disclose how many patients to whom they sent the survey. Not all respondents answered all questions in the surveys.

Patient survey:

The only negative responses were 15% reported the consultation was too long overall and that the orthodontist spent too much time with them in the consultation. These same 15% were not sure whether they would elect treatment at this office. These responses were regarding the same orthodontist. The remaining results were neutral or positive. The average amount of time spent researching the office before scheduling an appointment was 3.67 hours.

Orthodontist survey:

The most common respondents were white males (Tables 2,3). Respondent ages ranged from 29-88 years, with an average age of 50.64 years. 87.67% of respondents reported English as their first language and 83.53% reported no accent when speaking English. 29.80% of respondents reported speaking at least one language other than English. There were 35 languages spoken, 103 undergraduate majors, 53 undergraduate minors, 61 areas of concentrated study, 57 other degrees, 91 residencies (including some Canadian residencies), and practice types of private owner, private associate, corporate, and "other" described as hospital/medical group, office director, academic, independent contractor, consultant, military, and nonprofit/public health/per diem represented. The most common language spoken was Spanish at 35.89%, then French, Arabic, and Italian at 11.00%, 6.70%, and 4.78%, respectively. The most common practice type was private owner at 47.58% (Table 4). The most common practice setting was suburban at 66.15% (Table 5). There were 77 careers other than orthodontics experienced by respondents. Respondents had spent an average of 47.00 years in the United States and had practiced orthodontics for an average of 20.45 years. The most common undergraduate majors were biology majors (majors containing "bio-") at 47.29%,

chemistry majors (majors containing “chem-“) at 11.42%, psychology majors (majors containing “psych-”) at 5.21%, engineering majors at 3.61%, and zoology majors at 2.81%. Social science (business, economics, finance, government, sociology, political science, communication, human development) majors combined made up 5.21%, and humanities (Spanish, religious studies, music, humanities, history, German, English, comparative religion, communication, classics, art history, and art) majors 5.01%. The most common minor was chemistry at 26.49%, followed by biology, business, and psychology at 7.57%, 5.4%, and 5.4%, respectively. Of the 213 higher education degrees other than orthodontic masters and DDS/DMD reported, the most common were other masters degrees at 84.98%, 3.29% were specifically MBA’s, 3.76% were Ph.D.’s, and 2.8% were GPR/AEGD’s. Of the practitioners who reported careers other than orthodontists, the most common careers were other dental careers (general dentistry, pediatric dentistry, endodontics, dental hygiene, orofacial pain) at 23.77%, followed by teaching, other medical fields, and engineering at 10.66%, 9.84% and 6.56%, respectively. 67% of respondents have taken business, marketing, communications, or related courses in continuing education to improve their orthodontics consults. The average residency length of 27.79 months. 51.10% of respondents were wither board certified or in the process of getting board certified (Table 6). There were respondents who graduated from residency in every AAO constituent society: 15.5% in the Great Lakes Association of Orthodontists, 18.1% in the Midwestern Society of Orthodontists, 8.0% in the Middle Atlantic Society of Orthodontists, 1.0% in the Rocky Mountain Society of Orthodontists, 15% in the Northeastern Society of Orthodontists, 15.2% in the Pacific Coast Society of Orthodontists, 19.6% Southern Association of Orthodontists, and 7.5% in the Southwestern Society of Orthodontists.

Respondents reported an average conversion rate of 67.5% (SD 21.03).

The average time scheduled for an average and particularly detailed orthodontic consultation was 41.44 minutes (SD 16.98) and 49.83 minutes (SD 16.40), respectively. Respondents are present for 54.31% and 64.68% of their average and particularly detailed orthodontic consultations, respectively. 53% of respondents reported using patient decision aids at their consultations, while 35.60% were unfamiliar with what patient decision aids are (Table 7). 65.89% of respondents reported using digital visual aids regularly (87.62% reported using digital visual aids at least occasionally), 72.60% reported using handheld visual aids regularly (93.21% reported using handheld visual aids at least occasionally) at their orthodontic consultations. 80.15% of respondents agreed or strongly agreed that empathy is one of their strengths. 70.33% agreed or strongly agreed that inspiring enthusiasm is one of their strengths. The highest percentage of respondents (69.86%) chose the middle ground regarding willingness to compromise (Table 8). 80.33% of respondents encourage dialogue in their consults. 16.87% of respondents reported willingness provide patients with the paired patient survey, all of whom indicated they would like to provide the survey via their office staff. Only 9.16% provided email addresses to contact their staff to follow up with the patient survey.

Responses to Inquiries

There were 52 emailed inquiries received regarding the orthodontist survey and 4 emailed inquiries regarding the patient survey.

Of the orthodontist inquiries, nine were automatic email replies. Most of the remaining were messages declining to participate: three cited pandemic-related business, two cited no longer performing consults, five cited working in academia, hospital, or military, 17 cited retirement, and two cited unwillingness to involve their patients. Those citing academia, hospital, or military practices were encouraged to participate anyway, and those who cited disinclination to involve their patients were reminded the patient portion was optional and that their

participation as an orthodontist would still be appreciated. Those citing retirement were notified that their status in the ABO directory was “active” and subsequently were unsubscribed from the email list. Any who asked to be unsubscribed were thanked for their time and were unsubscribed without further question.

One office staff member required clarification of the patient survey distribution process. Two office staff members communicated they had completed their patient survey distribution. One patient emailed directly to notify that she had completed the patient survey.

Data Analysis

The response to the patient survey was too small for statistically significant analysis.

For the orthodontist survey, according to ANOVA analyses with 95% confidence intervals:

Asian respondents reported a statistically significantly less conversion rate compared to white respondents: 60.4% and 68.7%, respectively ($p<0.05$). There were no other statistically significant differences in conversion rates with regard to race ($p>0.05$). There were no statistically significant differences of conversion rates with regard to gender, English as a first language, or having an accent when speaking English ($p>0.05$).

There were no statistically significant differences in conversion rates for respondents having taken continuing educations courses in business, marketing, communications, or related courses compared to those who have not taken those courses ($P>0.05$).

Respondents working suburban practice settings reported statistically significantly higher conversion rates than those working urban practice settings at 69.8% and 62.3%, respectively ($p<0.05$). There were no other statistically significant differences in conversion rates with regard to area of practice ($p>0.05$). There were no other statistically significant differences in conversion rates with regard to ownership vs. associateship vs. corporate vs. other practice settings ($p>0.05$).

Respondents scheduled to complete their ABO board examinations reported statistically significantly higher conversion rates than respondents who were not board certified and higher than respondents who were already board certified at 75.4%, 68.3%, and 66.2% respectively ($p<0.05$). There were no other statistically significant differences in conversion rates with regard to board certification status.

Respondents graduated from residency in the Rocky Mountain Society of Orthodontists had the lowest average conversion rate at 63.5%, which was statistically significantly lower than the average conversion rates of respondents graduated from residency in the Southwestern Society of Orthodontists and Midwestern Society of Orthodontists ($p<0.05$). Respondents graduated from residency in the Southwestern Society of Orthodontists had the highest average conversion rate at 75.03%, which was statistically significantly higher than the average conversion rates of respondents graduated from residency in Rocky Mountain Society of Orthodontists, Pacific Coast Society of Orthodontists, and Southern Association of Orthodontists ($p<0.05$).

Respondents who reported regular use of digital visual aids at their consultations reported statistically significantly higher conversion rates than those who do not at 69.4% and 59.9%, respectively ($p<0.05$). There were no other statistically significant differences in conversion rates with regard to digital visual aids ($p>0.05$). There were no statistically significant differences of conversion rates with regard to general patient decision aids or handheld visual aids ($p>0.05$).

Respondents who chose to “strongly agree” with the statement “empathy is one of my strengths” reported statistically significantly higher conversion rates than those who chose to “neither agree nor disagree” with the statement at 70.1% and 62.0%, respectively. Respondents who chose to “disagree” with the statement “empathy is one of my strengths” also reported statistically significantly higher conversion rates than those who chose to “neither agree nor

disagree" with the statement at 76.3% ($p<0.05$). There were no other statistically significant differences in conversion rates with regard to empathy as a strength.

Respondents who chose to "strongly agree" with the statement "inspiring enthusiasm is one of my strengths" reported statistically significantly higher conversion rates than those who chose to "agree," "neither agree nor disagree," and "disagree" with the statement at 72.9%, 67.0%, and 63.8% respectively ($p<0.05$). There were no other statistically significant differences in conversion rates with regard to inspiring enthusiasm as a strength.

There were no statistically significant differences in conversion rates with regard to provider tendency to compromise or encourage dialogue during consultations ($P>0.05$).

According to linear regression analyses, there were no linear correlations found between conversion rate and respondent age ($r^2<0.05$), years of practice ($r^2<0.05$), years in the United states ($r^2<0.05$), year of graduation from residency ($r^2<0.05$), number of months of residency duration ($r^2<0.05$), time spent in average and difficult consultation ($r^2<0.05$), and % time practitioner spent in overall consultation time in average and difficult consultation ($r^2<0.05$).

According to the Fisher exact test, there was a statistically significant correlation between number of languages spoken and conversion rate ($p<0.05$). There was not a statistically significant correlation between number of higher education degrees (other than dental and orthodontic Masters degrees), areas of concentrated study in college, college majors, college minors, or careers other than orthodontics ($p>0.05$)

Discussion

Orthodontist Survey:

The statistically significantly lower self-reported conversion rate for Asian respondents may represent some kind of patient bias against this demographic, or a cultural difference between

provider and patient base manifesting as lower conversion rate. There could also be an incongruency in the veracity of the reports of conversion rates across the demographics of the respondents. It is possible that some demographics are more likely to exaggerate and other demographics are more likely to understate their conversion rates, but it would be beyond our power to verify this. If the results do represent a true consistent bias, this is the first time such a bias has surfaced in orthodontic literature, it would affect a significant population of orthodontists, and may warrant further address.

67% of respondents have taken business, marketing, communications, or related courses in continuing education to improve their orthodontics consults, but this study found no statistically significant difference in conversion rates for those who have taken such courses compared to those who have not taken the courses. This indicates that, despite their popularity, these courses are not efficacious. Such courses need improvement, or orthodontists may be better off investing their resources elsewhere to improve their conversion rates. To the authors knowledge, this is the first study in orthodontic literature to arrive at this conclusion.

The response from respondents graduating from residency in the Rocky Mountain Association of Orthodontists was notably lower than from the other constituent societies (1%). This is understandable due to the variable number of residencies within the respective constituent societies. The response from respondents graduating from residency in the Southwestern Society of Orthodontists was next lowest at 7.5%. Unfortunately, these smallest groups of respondents represent the lowest and the highest average conversion rates reported, respectively, bringing into question whether the findings based on these responses are generalizable and worth analyzing. Assuming they are, it is interesting to consider whether the orthodontic curriculum in the Rocky Mountain Association of Orthodontics could predispose a provider to a lower conversion rate, and an orthodontic curriculum in the Southwestern Society

of Orthodontics could predispose a provider to a higher conversion rate. If so, what is it in the curriculum that causes this disparity? Treatment modality (extraction vs non-extraction treatment, etc.)? Practice management courses? It would have been interesting to compare these average residency region conversion rates to current practice region conversion rates. It is likely that many providers stayed in the AAO region from which they graduated to practice, and that the region where they practice could have more of an influence on conversion rate than the residency itself. This could be an area for further research.

The statistically significant higher conversion rates of suburban respondents compared to urban respondents may indicate urban patients are more likely to "shop" for an orthodontist before deciding to start treatment with a given provider. The urban setting allows convenience to do so, as there are likely more practices within a reasonable travel radius of the patient. It seems unlikely that suburban respondents generally possess inherent qualities their urban colleagues lack that affect their conversion rates, but it is possible. To the authors knowledge, this is the first study in orthodontic literature to demonstrate this disparity.

Though only 65.89% of respondents reported using digital visual aids regularly, respondents who regularly use digital visual aids at their consultations reported statistically significantly higher conversion rates than those who do not. On the other hand, a higher 72.60% of respondents reported using handheld visual aids regularly, while using those handheld aids had no statistically significant effect on conversion rate. This suggests that providers have a proclivity for handheld aids, but transitioning towards digital aids may be indicated to improve conversion rates. The efficacy of transitioning towards digital aids is supported by the existing literature.[10,11]

Though respondents who "strongly agree" with the statement "inspiring enthusiasm is one of my strengths" reported statistically significantly higher conversion rates than those who

"agree," "neither agree nor disagree," and "disagree" with the statement at 72.9%, 67.0%, and 63.8% respectively (p=0.000), those who "strongly disagree" with the statement have a similar and statistically insignificantly different conversion rate (70.6%) to those who "strongly agree" with the statement. In other words, both those who "strongly agree" and "strongly disagree" with the statement had higher conversion rates than those who chose the intermediate responses of "disagree," "neither agree nor disagree," and "agree." This is curious, as otherwise, the gradual decrease of the 72.9%, 67%, and 63.8% conversion rates almost suggest a direct correlation of conversion rate to self-reported ability to inspire enthusiasm. This question yielded the lowest p value of any of the ANOVA analyses completed, thus was highly statistically significant. An explanation of these findings is that perhaps the "strong" responses represent a vehemence in the provider that translates through their consultations and results in a higher conversion rate. This is supported in part by the results of the question "empathy is one of my strengths," as the respondents who chose to "neither agree nor disagree" with the question have statistically significantly lower conversion rates than those both who "strongly agree" and "disagree" with the statement. The finding that respondents scheduled to complete their ABO board examinations reported statistically significantly higher conversion rates than both respondents who were not board certified and respondents who were already board certified could be explained by a similar effect. Providers presenting in a state of active self-improvement state may be perceived as more passionate than their perhaps more complacent colleagues. This passion may be what is attractive and persuasive to patients. To the authors knowledge, these findings and their offered explanations are novel in orthodontic literature. The correlation of number of languages spoken to higher conversion rate could be attributed to improved communication skills of the provider. Speaking certain languages could also attract a specific language-speaking patient population who is more likely to be loyal to the practitioner,

as speaking a specific language may be perceived by patients as a rare, valuable trait to find in an orthodontic provider. The ability to learn and speak several languages may also lend the provider towards the development of other unidentified attributes and/or skills that improve conversion rates. To the authors knowledge, this is the first study in orthodontic literature to arrive at this conclusion.

Limitations/Strengths

The American Association of Orthodontics (AAO) Partners in Research Program would have allowed access to a more comprehensive list of AAO members, but his was not pursued due to cost and delay of survey distribution. However, the unfortunate forced closure of orthodontic clinics during the Covid-19 pandemic provided a timely window to distribute the survey and maximize survey response rate.

Another limitation was reliance on self-reporting. There was no way to know whether the data reported was accurate. Inherent in voluntary surveys is the limitation of selection bias. The only data available to collect was that from providers willing to participate in the survey. Though measures were taken to send the survey to as many practicing orthodontists in the United States as possible, pure random sampling of United States orthodontists was not possible, so the generalizability of conclusions drawn from the collected data was limited. The data collected for the patient survey was even more selective and biased, as providers had control over to whom to send the survey. In the end, the response to the patient survey was deemed too biased and small to draw any generalizable conclusions from it.

The response for the patient survey wasn't to a scale relevant for cross-referencing orthodontist and patient data. Accessing the patient pool of non-academic patient populations is a hurdle that wasn't overcome in this study.

Limitations aside, a study comparing orthodontist data to their conversion rates had not been performed before. It reveals obstacles to conversion, opens doors to strategy development for conversion improvement, and piques further conversion questions to answer.

Areas for Further Research

A method to gather orthodontic patient data other than requesting contact information through their respective orthodontists may be indicated in another study. More prospective respondents are always an area of improvement for surveys, so something like the AAO Partners in Research Program could be utilized in a similar study to reach more orthodontists. Further research may also be warranted to explain lower conversion rates for Asian orthodontists, the implications of this finding, and to elucidate the dichotomous findings of higher conversion rates at either end of self-assessed abilities, such as that to inspire enthusiasm. Research to verify the novel findings of this study such as the poor efficacy of continuing education courses to improve consults and a closer look at how to improve these courses' efficacy may be helpful to the field. AAO constituent society of practitioner is a variable that may be valuable to compare to orthodontic residency in relation to conversion rate in follow-up study.

Conclusions

While the results of the patient survey stimulate further conjecture about patient decision-making, the small sample size could not be generalized to the population as a whole and therefore conclusions were not drawn from the patient data. For orthodontists, gender, age, English as a first language, accent, years in the United States, majors, minors, areas of concentrated undergraduate studies, other higher education degrees, duration of residency, year of graduation of residency, years of practice, owning/ associating/ working corporate/ other mode of practice, other careers, duration of consultation, percent orthodontist presence in consultation, ability to compromise, and dialogue during consult did not seem to influence

conversion rates. Further research could be warranted to explain lower conversion rates for Asian orthodontists and the implications of this finding. Despite their popularity, business, marketing, communications, or related courses in continuing education did not improve conversion rate. Despite the current opposite trend of which is more highly utilized, digital visual aids seemed to improve conversion rates, while handheld visual aids did not. Urban orthodontic positions had lower conversion rates than suburban orthodontic positions. While some data suggested inspiring enthusiasm was an important ability to achieve high conversion rates, communicating the genuine vehemence of a provider may have been more important than inspiring enthusiasm itself. Finally, the number of languages spoken by an orthodontist is correlated to higher conversion rate.

Literature Review

Ackerman and Proffit described a "case presentation conference," or an orthodontic consult (as it will be termed here) between orthodontic patient/parent and orthodontist, as consisting of three parts: (1) Presentation of diagnosis / problem list, (2) Presentation of risk/benefit of treatment options, and (3) Ascertaining patient / parent expectations and values.[4] After the orthodontic consult, some parents/patients will elect no treatment. Sometimes this is even the recommended option. On other occasions, patients/parents elect no treatment at an orthodontic office for reasons unknown by the orthodontist. Are these reasons qualifiable? The reasons are likely multifactorial.[6] Is the extent of each factor's impact on parent/patient decisions quantifiable?

Communication is a consistent theme critical to all consults. Ackerman and Proffit stressed that while the orthodontist presents information at the consult, dialogue between doctor and patient is critical to reach consensus.[4] Wong et al recommended training in communication for all orthodontic office staff to ensure high patient satisfaction.[12] Crerand et al found that

communication between family and orthodontic provider greatly impacted adherence, and recently called for more mixed methods studies / qualitative interviews and surveys "to better understand factors that impact adherence to orthodontic care and ways to enhance patient, family, and provider experiences."[13] The current study aims to do just this. For the purposes of the current study, perhaps superior communication skills during orthodontic consult may influence patient/parent decision to start orthodontic treatment.

Healthcare fields strive to help patients to make the best possible treatment decisions for their patients. A Cochrane review in 2017 analyzed decision aids in health treatment decisions, defining decision aids as, "interventions that support patients by making their decisions explicit, providing information about options and associated benefits/harms, and helping clarify congruence between decisions and personal values," and list examples such as pamphlets, videos, and web-based tools.[7] This definition correlates directly with Ackerman and Proffit's ideal consultation. The Chochrane review found that using decision aids increased the length of consultations by 2.6 minutes (7.5% increase), costs were lower, there were no adverse outcomes, and patients exposed to decision aids felt more knowledgeable, better informed, and clearer about their values.[7] This lead to the author's conclusion that decision aids likely improve values-congruent choices, but conceded further research would be needed to ascertain whether patients adhered to their treatment choice.[7] For the purposes of the current study, perhaps patients who feel more self-actualized or empowered to select a treatment option during a consult may be more likely to start orthodontic treatment.

Elwyn et al maintains that while there is plenty of research yielding theories on decision-making, there are fewer recommendations for how health practitioners could better influence good treatment decisions for their patients in practice, noting a "theory-practice gap" that decision

aids may aim to close.[9] For the purposes of this study, perhaps use of decision aids may be a practical tool for orthodontists to convert a consultation to an orthodontic treatment start. There have been some studies analyzing decision aids in orthodontics. Phillips et al studied the influence of video imaging in treatment presentation as early as 1995.[10] They found that while video image projections did not directly affect treatment decisions, video imaging was ranked as the best information source compared to other decision aids. Sarver et al found that video imaging improved orthodontist-patient communication, patients reported the video imaging helped their treatment decision, and that the video imaging did not pressure them into esthetic changes they didn't want.[11] Parker et al performed a randomized controlled trial analyzing the efficacy of decision aids in reducing decisional conflict but did not find any significant differences.[6] Eddaiki et al referenced Stacey et al 2014 to develop a Fixed Appliance Decision Aid and measured decisional conflict and patient perception of satisfaction, and found a decrease in decisional conflict but maintains that orthodontic patient decision aids have only been minimally researched and more studies would be beneficial.[8] Furthermore, Stacey et al reports even fewer studies still that analyze decision aids used within an orthodontic consultation as compared to decision aids delivered before consultation, further underscoring the need for further investigation into the consult itself.[7] For the purposes of the current study, perhaps use of decision aids during orthodontic consult may influence patient/parent decision to start orthodontic treatment.

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OREGON HEALTH & SCIENCE UNIVERSITY

Information Sheet

IRB#__21177_____

TITLE: Variables of Consultation Experience Influencing Orthodontic Treatment Plan Acceptance

PRINCIPAL INVESTIGATOR: Tobie Jones, DMD (503)-346-4721

CO-INVESTIGATORS: Shannon Schober, DMD (503)-422-7969

Sohyon Kim, DMD (503)-494-8921

Richie Kohlie BDS, MS (503)-494-3067

Cynthia Taylor, Ph.D. taylorcy@ohsu.edu

Mansen Wang, MS, Ph.D

WHY IS THIS STUDY BEING DONE?:

You have been invited to be in this research study because you are a practicing orthodontist. The purpose of this study is to learn how the orthodontic consultation experience influences treatment plan acceptance and starting orthodontic treatment at orthodontic offices.

Data collected from/about you in this study will not be used and/or shared for future research.

WHAT PROCEDURES ARE INVOLVED IN THIS STUDY?:

You will complete a survey regarding orthodontic consults at your office. You will then provide a different survey to your recently consulted patients for your patients or guardians of your patients to complete regarding their orthodontic consultation experience. After the surveys are complete and the email addresses of patients consulted within the last month who may be interested in filling out the patient survey are provided, participation in the study is over. The responses to both surveys will be kept anonymous. Your survey will take approximately 15 minutes to complete.

If you have any questions, concerns, or complaints regarding this study now or in the future, or you think you may have been injured or harmed by the study, contact *Sohyon Kim* (503)-494-8921.

WHAT RISKS CAN I EXPECT FROM TAKING PART IN THIS STUDY?:

Although we have made every effort to protect your identity, there is a minimal risk of loss of confidentiality.

WHAT ARE THE BENEFITS OF TAKING PART IN THIS STUDY?:

You will not benefit from being in this study. However, by serving as a subject, you may help us learn how to benefit orthodontists and their patients in the future.

WHAT ARE THE ALTERNATIVES TO TAKING PART IN THIS STUDY?:

You may choose not to be in this study.

WILL I RECEIVE RESULTS FROM THIS STUDY?

Research findings will not be directly disclosed to the subjects/providers you because the research is still in an early phase and the reliability of the results is unknown, but anonymous study results may be accessible at the completion of the study.

WHO WILL SEE MY PERSONAL INFORMATION?:

In this study we will take steps to keep your personal information confidential, but we cannot guarantee total privacy. However, we will do our best to keep your information confidential by keeping it coded and on an encrypted computer.

If your information goes outside of OHSU, it might not be protected under federal law from being used or further shared. We would like your permission to keep your data until December 2020. If you decide you don't want us to use your name and information for future contact, you can request this by contacting us at:

Name Tobie Jones, DMD

Department School of Dentistry
Oregon Health & Sciences University
Address 2730 SW Moody Ave, Portland, OR 97201
Email address kohli@ohsu.edu

Your request will be effective as of the date we receive it. However, health information collected before your request is received may continue to be used and disclosed to the extent that we have already acted based on your authorization.

You do not have to allow the use and disclosure of your health information in the study, but if you do not, you cannot be in the study. If you choose not to participate, or if you decide to stop at any time, that will not affect your ability to receive health care at OHSU or insurance coverage.

WILL ANY OF MY INFORMATION OR SAMPLES FROM THIS STUDY BE USED FOR ANY COMMERCIAL PROFIT? Information about you or obtained from you in this research may be used for commercial purposes, such as making a discovery that could, in the future, be patented or licensed to a company, which could result in a possible financial benefit to that company, OHSU, and its researchers. There are no plans to pay you if this happens. You will not have any property rights or ownership or financial interest in or arising from products or data that may

result from your participation in this study. Further, you will have no responsibility or liability for any use that may be made of your samples or information.

WHERE CAN I GET MORE INFORMATION?:

This research is being overseen by an Institutional Review Board ("IRB"). You may talk to the IRB at (503) 494-7887 or irb@ohsu.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get more information or provide input about this research.

You may also submit a report to the OHSU Integrity Hotline online at https://secure.ethicspoint.com/domain/media/en/gui/18915/index.html or by calling toll-free (877) 733-8313 (anonymous and available 24 hours a day, 7 days a week).

DO I HAVE TO TAKE PART IN THIS STUDY?

You do not have to join this or any research study. If you do join, and later change your mind, you may quit at any time. If you refuse to join or withdraw early from the study, there will be no penalty or loss of any benefits to which you are otherwise entitled.

The participation of OHSU students or employees in OHSU research is completely voluntary and you are free to choose not to serve as a research subject in this protocol for any reason. If you do elect to participate in this study, you may withdraw from the study at any time without affecting your relationship with OHSU, the investigator, the investigator's department, or your grade in any course. If you would like to report a concern with regard to participation of OHSU students or employees in OHSU research, please call the OHSU Integrity Hotline at 1-877-733-8313 (toll free and anonymous).

HOW DO I TELL YOU IF I WANT TO TAKE PART IN THIS STUDY?

Fill out the survey provided.

What is your gender?

- ○ Female
- ○ Male
- ○ Prefer to self-describe

What is your age?

0 10 20 30 40 50 60 70 80 90 100

years

What is your race / ethnicity?

- ○ White
- ○ Black or African American
- ○ American Indian or Alaska Native
- ○ Hispanic
- ○ Asian
- ○ Native Hawaiian or Pacific Islander
- ○ More than one race (please describe)
- ○ other (please describe)

Is English your first language?

- Yes
- No

Do you think you have an accent when you speak English?

- Yes
- No

Do you speak more than one language? If so, please list below:

Language 1

Language 2

Language 3

Other languages

I have lived in the United States for _ _ years.

Please list any completed undergraduate majors.

Major 1

Major 2

Major 3

Enter any additional majors:

Please list any completed undergraduate minors.

Minor 1

Minor 2

Minor 3

enter any additional minors:

Please list any other areas of concentrated undergraduate studies (uncompleted minors, majors, or areas of study within which 3 or greater courses were taken).

Area 1

Area 2

Area 3

Other areas

Please list any other higher education degrees earned, and in which fields.

Degree 1

Degree 2

Degree 3

Other degrees

I have taken business, marketing, communications, or related courses in continuing education to improve my orthodontic consults.

- Yes
- No

What year did you graduate from orthodontic residency?

1945 1952 1960 1967 1975 1982 1989 1997 2004 2012 2019

The year

From what orthodontic residency did you graduate?

How many months was your orthodontic residency?

0 4 7 11 14 18 22 25 29 32 36

months

How many years have you practiced orthodontics?

0 7 14 21 28 35 42 49 56 63 70

years

Please select all settings in which you have practiced orthodontics.

- [ ] Private practice - owner
- [ ] Private practice - associate
- [ ] Corporate practice
- [ ] Other

Which setting best describes your area of practice?

- ○ Urban
- ○ Suburban
- ○ Rural
- ○ Frontier

Are you a board certified orthodontist?

- ○ Yes.
- ○ I am scheduled to complete my board examinations.
- ○ No.

If orthodontics was / is not your only career, please list any other careers.

Career 1

Career 2

Career 3

Other careers

What is your conversion rate from new patient exams to treatment starts in an average month?

How much time do you schedule for an average orthodontic consultation?

What is the maximum time you have scheduled for a particularly detailed consultation?

I am present for _ _ _% of an average orthodontic consultation (I have trained staff to perform the remainder).

I am present for _ _ _% of a particularly difficult orthodontic consultation (I have trained staff to perform the remainder).

Patient Decision Aids are used at my orthodontic consultations.

- ○ Yes
- ○ No
- ○ What is a Patient Decision Aid?

Digital visual aids are used at my orthodontic consultation.

- ○ Yes
- ○ Occasionally
- ○ No

Handheld visual aids are used at my orthodontic consultations.

- ○ Yes
- ○ Occasionally
- ○ No

Empathy is one of my strengths.

- ○ strongly disagree
- ○ disagree
- ○ neither agree nor disagree
- ○ agree
- ○ strongly agree

Inspiring enthusiasm is one of my strengths.

- ○ strongly disgree
- ○ disagree
- ○ neither agree nor disagree
- ○ agree
- ○ strongly agree

Choose the statement that best describes you.

- ○ I do not waver once I have communicated my opinion to a patient.
- ○ I am open to small treatment compromises if the overall outcome isn't compromised.
- ○ I am open to treatment compromises if they make the patient happy.

Choose the statement that best describes you.

- ○ My staff or I do most of the talking during consults.
- ○ I encourage dialogue in my consults.

Would you be willing to let us or have your office staff email a survey to a sample of your recent consults?

- ○ Yes, I would be willing to have my staff forward the survey. The name and email of my staff to contact is:

- ○ Yes, I would be willing to provide the names and emails of patients for the surveyors to contact themselves.
- ○ No.

Thank you! Please provide a list of potential (guardians of) patients with whom you have consulted on or after February 1st, 2020, including names and emails. Your answers so far have been saved. Please don't click "submit" until you have completed your upload. You may reopen your survey from your email hyperlink until you click "submit."

Drop files or click here to upload

submit

Patient Survey: Orthodontic Consult

OREGON HEALTH & SCIENCE UNIVERSITY

Information Sheet

IRB#_21177_

TITLE: Variables of Consultation Experience Influencing Orthodontic Treatment Plan Acceptance

PRINCIPAL INVESTIGATOR: Tobie Jones, DMD (503)-346-4721

CO-INVESTIGATORS: Shannon Schober, DMD (503)-422-7969

Sohyon Kim, DMD (503)-494-8921

Richie Kohlie BDS, MS (503)-494-3067

Cynthia Taylor, Ph.D. taylorcy@ohsu.edu

Mansen Wang, MS, Ph.D

WHY IS THIS STUDY BEING DONE?:

You have been invited to be in this research study because you are an orthodontic patient. The purpose of this study is to learn how the orthodontic consultation experience influences treatment plan acceptance and starting orthodontic treatment at orthodontic offices.

WHAT PROCEDURES ARE INVOLVED IN THIS STUDY?:

You will be asked to complete a survey regarding your recent orthodontic consult. The survey will take approximately 10 minutes. The responses to the surveys will be kept anonymous. After the surveys are complete, participation in the study is over.

If you have any questions, concerns, or complaints regarding this study now or in the future, or you think you may have been injured or harmed by the study, contact *Sohyon Kim* (503)-494-8921.

WHAT RISKS CAN I EXPECT FROM TAKING PART IN THIS STUDY?:

Although we have made every effort to protect your identity, there is a minimal risk of loss of confidentiality.

WHAT ARE THE BENEFITS OF TAKING PART IN THIS STUDY?:

You will not benefit from being in this study. However, by serving as a subject, you may help us learn how to benefit orthodontists and their patients in the future.

WHAT ARE THE ALTERNATIVES TO TAKING PART IN THIS STUDY?:

You may choose not to be in this study.

WILL I RECEIVE RESULTS FROM THIS STUDY?

Research findings will not be directly disclosed to the subjects/providers you because the research is still in an early phase and the reliability of the results is unknown, but anonymous study results may be accessible at the completion of the study.

WHO WILL SEE MY PERSONAL INFORMATION?:

In this study we will take steps to keep your personal information confidential, but we cannot guarantee total privacy. However, we will do our best to keep your information confidential by keeping it coded and on an encrypted computer.

If your information goes outside of OHSU, it might not be protected under federal law from being used or further shared. We would like your permission to keep your data until December 2020. If you decide you don't want us to use your name and information for future contact, you can request this by contacting us at:

Name Tobie Jones, DMD

Department School of Dentistry
Oregon Health & Sciences University
Address 2730 SW Moody Ave, Portland, OR 97201
Email address kohli@ohsu.edu

Your request will be effective as of the date we receive it. However, health information collected before your request is received may continue to be used and disclosed to the extent that we have already acted based on your authorization.

You do not have to allow the use and disclosure of your health information in the study, but if you do not, you cannot be in the study. If you choose not to participate, or if you decide to stop at any time, that will not affect your ability to receive health care at OHSU or insurance coverage.

WILL ANY OF MY INFORMATION OR SAMPLES FROM THIS STUDY BE USED FOR ANY COMMERCIAL PROFIT? Information about you or obtained from you in this research may be used for commercial purposes, such as making a discovery that could, in the future, be patented or licensed to a company, which could result in a possible financial benefit to that company, OHSU, and its researchers. There are no plans to pay you if this happens. You will not have any property rights or ownership or financial interest in or arising from products or data that may result from your participation in this study. Further, you will have no responsibility or liability for any use that may be made of your samples or information.

WHERE CAN I GET MORE INFORMATION?:

This research is being overseen by an Institutional Review Board ("IRB"). You may talk to the IRB at (503) 494-7887 or irb@ohsu.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get more information or provide input about this research.

You may also submit a report to the OHSU Integrity Hotline online at https://secure.ethicspoint.com/domain/media/en/gui/18915/index.html or by calling toll-free (877) 733-8313 (anonymous and available 24 hours a day, 7 days a week).

DO I HAVE TO TAKE PART IN THIS STUDY?

You do not have to join this or any research study. If you do join, and later change your mind, you may quit at any time. If you refuse to join or withdraw early from the study, there will be no penalty or loss of any benefits to which you are otherwise entitled.

The participation of OHSU students or employees in OHSU research is completely voluntary and you are free to choose not to serve as a research subject in this protocol for any reason. If you do elect to participate in this study, you may withdraw from the study at any time without affecting your relationship with OHSU, the investigator, the investigator's department, or your grade in any course. If you would like to report a concern with regard to participation of OHSU students or employees in OHSU research, please call the OHSU Integrity Hotline at 1-877-733-8313 (toll free and anonymous).

HOW DO I TELL YOU IF I WANT TO TAKE PART IN THIS STUDY?

Fill out the survey provided

Who is your orthodontist (please type in):

Last name

First name

Location (city, state)

What is your gender?

- ○ Female
- ○ Male
- ○ Prefer to self-describe:

What is your age?

0 10 20 30 40 50 60 70 80 90 100

years

What is your race/ethnicity?

- ○ White
- ○ Black or African American
- ○ American Indian or Alaska Native
- ○ Hispanic
- ○ Asian
- ○ Native Hawaiian or Pacific Islander
- ○ More than one race (please describe)
- ○ Other (please describe)

Is English your first language?

- ○ Yes
- ○ No

Do you think you have an accent when you speak English?

- ○ Yes
- ○ No

Do you speak more than one language? If so, please list below:

Language 1

Language 2

Language 3

Other languages

I have lived in the United States for _ _ years.

The length of time for my entire orthodontic consultation appointment (including time with orthodontic assistant[s], treatment coordinator[s], and orthodontist) was:

- ○ Too long
- ○ Appropriate
- ○ Too short

The length of time the orthodontist (not staff) spent with me during the consultation was:

- ○ Too long
- ○ Appropriate
- ○ Too short

Please indicate the degree to which you agree or disagree with the following statements about your consultation:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My questions were adequately answered during my consultation.	○	○	○	○	○
The provider(s) giving my consultation was/were willing to compromise based on my needs.	○	○	○	○	○
The provider(s) giving my consultation inspired excitement for my orthodontic treatment.	○	○	○	○	○
The provider(s) giving my consultation was/were empathetic.	○	○	○	○	○
Based on our interactions at the consult, I have confidence in the skills of my orthodontist.	○	○	○	○	○
Based on our interactions at the consult, I am excited to have my orthodontic treatment at this office.	○	○	○	○	○
Based on our interactions at the consult, I am nervous for my orthodontic treatment.	○	○	○	○	○
The appearance / attire of the office staff positively influenced my decision to elect treatment at this office.	○	○	○	○	○
The interior of the office (cleanliness, comfort, decoration, etc.) positively influenced my decision to elect treatment at this office.	○	○	○	○	○
The interactions of the staff (friendliness, professionalism, etc.) positively influenced my decision to elect treatment at this office.	○	○	○	○	○
The orthodontic treatment modalities offered (traditional braces, ceramic brackets, clear aligners/invisalign) positively influenced my decision to elect treatment at this office.	○	○	○	○	○
The cost of treatment offered at this office was reasonable.	○	○	○	○	○

Please use the slider below to indicate about how much time you spent independently researching orthodontic treatment before your consultation with this office:

0 1 2 3 4 5 6 7 8 9 10

hours

After this consultation, I / my child have / has elected treatment at this office.

- ○ Yes
- ○ No
- ○ Not sure

We thank you for your time spent taking this survey.
Your response has been recorded.

MIRB#21177

2/19/20

Subject line: RE: SECURE

Dear Orthodontist and Future Colleague,

I am a current orthodontic resident completing my Masters thesis at OHSU School of Dentistry in Portland, OR. I obtained your contact information from the AAO directory and was hoping you may consider participating in my research involving a paired survey of orthodontists and some of their patients.
Thank you for taking the time to consider helping me!

The name of the research study is "Variables of Consultation Experience Influencing Orthodontic Treatment Plan Acceptance." The purpose of this study is to learn how the orthodontic consultation experience influences treatment plan acceptance and exam to treatment start conversion rates at orthodontic offices.

Participation is voluntary. Part of your survey will invite you to elect one of two options to survey your patients consulted on or after 2/1/20, but doing so is not mandatory to complete your survey.

Please click the following link and complete the survey if you would like to participate. Attached is an information sheet for more information and if you have further questions, please contact Shannon Schober, DMD at *schobers@ohsu.edu or 503-494-8921*. If we do not receive a letter from you within two weeks, someone may call you to make sure you received this email.

I appreciate your interest in OHSU orthodontic resident research. Thank you!

Sincerely,

Shannon Schober, DMD

MIRB#21177

4/23/20

Subject line: RE: SECURE: Follow-up to: Orthodontic resident research: help by participating in a 15-minute survey!

Dear Valued Orthodontic Team Member,

I am a current orthodontic resident completing my master's thesis at OHSU School of Dentistry in Portland, OR. An orthodontist at your office was kind enough to participate in my project involving a paired survey of orthodontists and some of their patients.

Because the orthodontist answered a question: "Yes, I would be willing to have my staff forward [the patient] survey…" and entered your email, I am contacting you for your clinic's continued help.

Thank you for taking the time to help me!

This email contains a link to the patient survey. **PLEASE DO NOT FORWARD THIS LINK TO YOUR PATIENTS.** The purpose of this email is only for your clinic's information.

You will soon receive **ANOTHER** email addressed to your patients. Please forward **THAT** email without alteration **to patients consulted on or after 2/1/20** at your clinic. If you have further questions, please contact Shannon Schober, DMD at *schobers@ohsu.edu or 503-494-8921*. If we do not receive survey responses within two weeks, someone may contact you to make sure you received this email.

I appreciate your interest in OHSU orthodontic resident research. Thank you!

Sincerely,

Shannon Schober, DMD

MIRB#21177

2/19/20

Subject line: RE: SECURE

Dear Valued Orthodontic Patient,

I am a current orthodontic resident completing my Masters thesis at OHSU School of Dentistry in Portland, OR. Your orthodontist has indicated you might like to hear more about my research and maybe even consider participating.

Thank you for taking the time to consider helping me!

The name of the research study is “Variables of Consultation Experience Influencing Orthodontic Treatment Plan Acceptance.” The purpose of this study is to learn how the orthodontic consultation experience influences patients like you to start orthodontic treatment at an orthodontic office.

Participation is voluntary. Please click the following link and complete the survey if you would like to participate. Attached is an information sheet for more information and if you have further questions, please contact Shannon Schober, DMD at *schobers@ohsu.edu or 503-494-8921*. If we do not receive a letter from you within two weeks, someone may call you to make sure you received this email.

I appreciate your interest in OHSU orthodontic resident research. Thank you!

Sincerely,

Shannon Schober, DMD

Appendix F: IRB Approval

IRB MEMO

Research Integrity Office
3181 SW Sam Jackson Park Road - L106RI
Portland, OR 97239-3098
(503)494-7887 irb@ohsu.edu

APPROVAL OF SUBMISSION

March 4, 2020

Dear Investigator:

On 3/4/2020, the IRB reviewed the following submission:

IRB ID:	STUDY00021177
Type of Review:	Initial Study
Title of Study:	Variables of Consultation Experience Influencing Orthodontic Treatment Plan Acceptance
Principal Investigator:	Tobie Jones
Funding:	None
IND, IDE, or HDE:	None
Documents Reviewed:	• Consent-Information Sheet- patients • Recruitment letter- Orthodontists • Recruitment letter- patients • Orthodontist Survey 2.23.20.docx • Patient Survey 2.23.20.docx • Consent- Information Sheet- Orthodontist • Protocol 2.24.20.doc • PPQ

The IRB granted final approval on 3/4/2020. The study requires you to submit a check-in before 3/2/2023.

Review Category: Exempt Category #2

Copies of all approved documents are available in the study's **Final** Documents (far right column under the documents tab) list in the eIRB. Any additional documents that require an IRB signature (e.g. IIAs and IAAs) will be posted when signed. If this applies to your study, you will receive a notification when these additional signed documents are available.

Ongoing IRB submission requirements:

- Six to ten weeks before the eIRB system expiration date, submit a check-in..
- Any changes to the project must be submitted for IRB approval prior to implementation.
- Reportable New Information must be submitted per OHSU policy.
- Submit a check-in to close the study when your research is completed.

Guidelines for Study Conduct

In conducting this study, you are required to follow the guidelines in the document entitled, "Roles and Responsibilities in the Conduct of Research and Administration of Sponsored Projects," as well as all other applicable OHSU IRB Policies and Procedures.

Requirements under HIPAA

If your study involves the collection, use, or disclosure of Protected Health Information (PHI), you must comply with all applicable requirements under HIPAA. See the HIPAA and Research website and the Information Privacy and Security website for more information.

IRB Compliance

The OHSU IRB (FWA00000161; IRB00000471) complies with 45 CFR Part 46, 21 CFR Parts 50 and 56, and other federal and Oregon laws and regulations, as applicable, as well as ICH-GCP codes 3.1-3.4, which outline Responsibilities, Composition, Functions, and Operations, Procedures, and Records of the IRB.

Sincerely,

The OHSU IRB Office