

Insights From San Francisco Match Rank Lists, Part II

Are Programs Doing It Wrong?

Purushottam A. Nagarkar, MD,* Menyoli Malafa, MD,* and Jeffrey E. Janis, MD, FACS†

Background: It is well known that the ideal method of creating rank lists for the match is the “true-preference” strategy. However, there is anecdotal and survey-based evidence that programs and applicants often deviate from this strategy. We analyzed rank lists of applicants and programs participating in the Plastic Surgery San Francisco Match to investigate whether programs were following an optimal strategy.

Methods: We obtained deidentified program and applicant rank lists and their match results from SF Match for 4 years (2010–2013). Statistical analysis was carried out with Microsoft Excel.

Results: The number of applicants, applications submitted, interviews offered, and match rate were all relatively stable over this 4-year period (range, 117–138 applicants, 36–41 applications, 9.0–10.3 interviews per applicant, and 78%–86% match rate). The “number needed to match” for programs was 4 (range, 1–21). A subset of applicants had poor average ranks on program rank lists but was nevertheless ranked to match by one program. Forty-six percent of these applicants matched at their top choice compared to 20% of matched controls.

Conclusions: The independent Plastic Surgery Match has become less competitive over the last decade. The low average number needed to match in the context of a high applicant match rate supports the hypothesis that programs and applicants may be modifying rank lists from a true-preference list. Non-competitive applicants are occasionally ranked to match by a program, and these applicants tend to match at their top choice far more often than the average applicant—providing further support to this hypothesis.

Key Words: San Francisco match, SF match, match, rank list, plastic surgery match, independent match, independent plastic surgery

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Plastic surgery programs have been in the midst of significant changes for some time. Over the past 30 years, integrated programs (which accept graduating medical students into a categorical 6-year training pathway directly out of medical school) have increased in number and size, from a total of 3 residency positions offered in 1983 to 116 in 2013. They have also remained fiercely competitive, with a match rate of only approximately 45% in 2013. Meanwhile, the independent pathway, which had been the traditional method of plastic surgery training, saw a rapid decline in the number of positions (Fig. 1). For example, there were 232 applicants for 100 positions in 2004 (match rate, 43%), but only 103 applicants for 85 positions in 2010 (match rate, 83%). For the past 4 years, the independent match has stabilized, with a match rate of approximately 80%

(Fig. 2). There are minimal published data regarding the behaviors of integrated and independent pathway applicants and programs as they go through these significant changes. It has been shown that in general, the ideal strategy in approaching the match is to follow the “true-preference” strategy, that is, to create rank lists that reflect one’s true preferences, whether you are on the program side or the applicant side.¹ This stands in contrast to making rank lists based on perceptions of what your counterparts are doing (eg, a program raising the rank of an applicant it believes is going to rank it highly). Our goal was to analyze rank lists and outcomes of both applicants and programs and to investigate whether participants were following this strategy.

METHODS

Institutional review board approval was not required for this study, as it did not meet the definition of human subject research—data requested and received were completely deidentified—and did not involve any intervention or interaction with the individuals and institutions involved.

Five years of deidentified rank list and application data was formally requested from the National Resident Matching Program (NRMP) and the San Francisco Match (SF Match). The NRMP denied our request, responding with their policy that “individual level data, even de-identified, will not be released, especially when it concerns the rank order list.” We received 4 years of fully deidentified data from the SF Match (match years 2009–10, 2010–11, 2011–12, and 2012–13). No individually identifiable information about applicants or programs was available to us; all participants were identified by random alphanumeric codes.

Data analysis was carried out with spreadsheet software (Excel; Microsoft Corp, Redmond, Wash). Applicants who registered with SF Match but did not file a rank list were excluded from the analysis. Similarly, programs that registered with SF Match but were not offering any resident positions were excluded from the analysis. Applicant ranks on program rank lists were normalized, that is, expressed a fraction of the number of positions offered by the program. For example, for a program that offered 3 positions, an applicant ranked third had a normalized rank of 1. Any resident with a normalized rank of 1 or lower was said to have been “ranked to match” by the program. By definition, therefore, being ranked to match meant that the applicant would always be accepted by this program if he was not accepted at another program higher on his rank list. This allowed comparative analysis of the rank lists of programs that offered different numbers of residency positions.

We analyzed each applicant’s number of applications, interviews, length of rank list, position on rank list at which he matched, and position on the normalized rank list of every program that ranked him (program rank of applicant [PRA]). Similar analysis was carried out on subsets of applicants.

RESULTS

No demographic or other personal information was available about any applicant. Similarly, no geographic information was available about any program.

Aggregate Program Data

There were 51 programs offering 97 positions in 2009–2010, 53 programs and 97 positions in 2010–2011, 51 programs offering

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Reprints: Jeffrey E. Janis, MD, FACS, Department of Plastic Surgery, Ohio State University, Wexner Medical Center, 915 Olentangy River Rd, Suite 2100, Room 2114, Columbus, OH 43212. E-mail: Jeffrey.Janis@osumc.edu.

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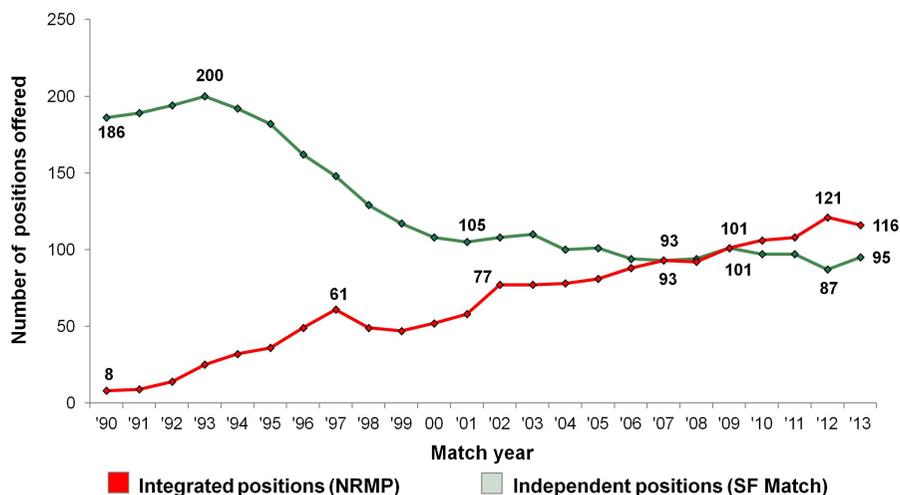


FIGURE 1. Number of residency positions offered in integrated and independent plastic surgery programs by year.

87 positions in 2011–2012, and 54 programs offering 95 positions in 2012–2013. The program match rates were 87%, 98%, 99%, and 95% in the 4 respective years (Fig. 3). The median normalized “number needed to match” for programs over the 4-year period was 4 (range, 1–21), that is, programs needed to rank a median of 4 applicants for each position they wanted to fill.

Aggregate Applicant Data

A total of 613 applicants registered with SF Match over the 4-year period: 146, 166, 167, and 134 in 2010, 2011, 2012, and 2013, respectively (Fig. 4). Of these, 503 submitted applications (120, 138, 128, and 117), 434 received one or more interview offers and submitted a rank list (103, 116, 110, and 105), 426 were ranked by programs (98, 116, 108, and 104), and 355 matched into a program (84, 95, 86, and 90).

The average applicant applied to 41 programs in 2009, and this number decreased to 38 in 2010 and further to 36 in 2011. Similarly, the mean number of interviews offered—and length of applicant rank list—decreased from 9.8 to 9 over this period. The year 2012–2013 saw a slight increase in average applications and interviews offered, with 39 and 10.3, respectively (Fig. 5). On average, applicants were ranked by 8.7 programs and had a normalized PRA of 6.7 ± 3.0 .

Based on the number of applicants who submitted a rank list as the denominator, the applicant match rates were 82%, 82%, 78%, and 86% in 2010, 2011, 2012, and 2013 (Fig. 2). Of the applicants who matched, 37% did so at their top choice (Fig. 6).

Subset Data

The subset of interest (group 1, $n = 58$) was defined as consisting of applicants who had a high PRA (ie, they received, on average, poor ranks from the programs that ranked them) but nevertheless were ranked to match by one or more programs. A control subset ($n = 224$) was defined as applicants who had an equally high PRA but were not ranked to match by any programs. The mean normalized PRA was 8.4 for group 1 and 8.5 for group 2. The match rate was 97% for group 1 and 67% for the control group. Forty-six percent of group 1 applicants matched their top choice, compared to 20% of the controls (Fig. 7).

DISCUSSION

The independent plastic surgery match has been on the decline for at least the past decade. From 2004 to 2010, the number of offered positions and applicants steadily decreased, whereas the match rate rose from 43% to 83%. These 3 metrics and the number of

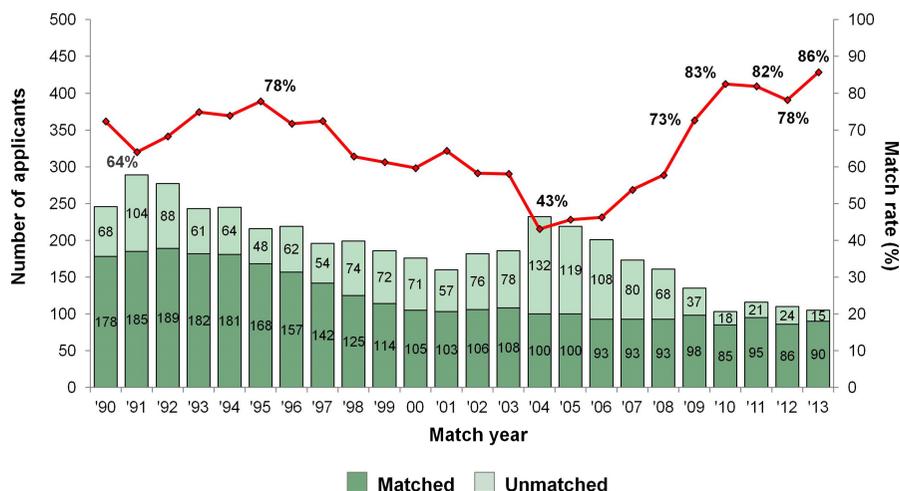


FIGURE 2. Number of matched and unmatched applicants and resultant match rate for the independent plastic surgery match by year.

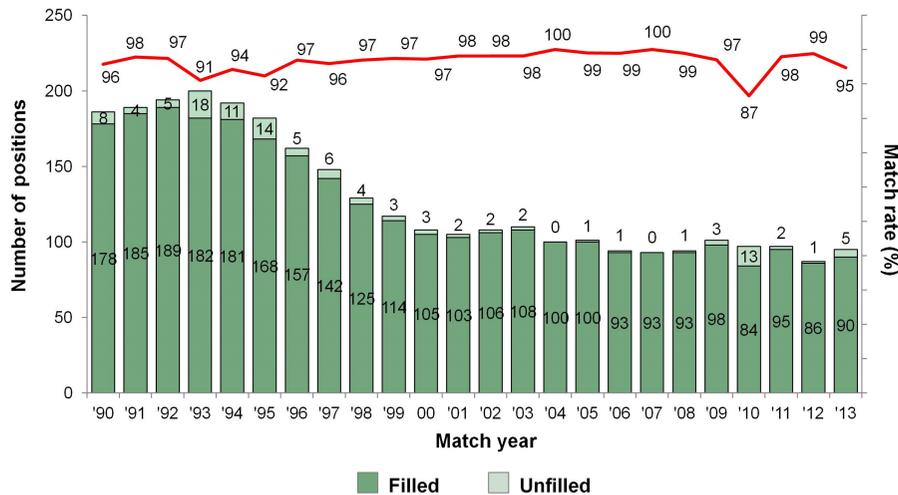


FIGURE 3. Number of filled and unfilled positions and resultant program fill rate for the independent plastic surgery match by year.

applications submitted per applicant as well as the mean length of applicant rank lists were stable over the past 4 years. A large number of matched applicants were able to match at their top choice (37%), and most applicants matched within their top 3 choices (71%).

One would expect that good candidates would be ranked well by most programs, and poor candidates would similarly be poorly ranked or not ranked at all. However, we found that program rank lists had significant variability: only a small handful of candidates had consistently high or low ranks, and in general, there was a large standard deviation in the average normalized program rank of an applicant (6.7 ± 3.0). A wide range of rankings (normalized PRA, 4.9 ± 2.2) was found even when we examined applicants who had been ranked to match by one or more programs (Fig. 8). There are 2 likely explanations of this finding. First, different programs probably have different criteria for evaluating applicants. Second, applicants are competing within different pools at each program where they interview; as such, the rank they receive at a given program is not an absolute indicator of their quality but is only meaningful relative to the other applicants on that program's rank list. Since the overall quality of the

applicant pool will vary from program to program, this will create inherent variability in the rank of an applicant.

We identified a subset of applicants who were ranked to match by one program but very poorly ranked by the other programs where they were interviewed. Our interpretation is that these applicants were objectively poor candidates (as implied by the poor ranks they received in general) and that the programs that had ranked these applicants to match were likely not following a true-preference strategy. This subset of applicants matched more often at their top choice (46%) and within their top 3 choices (78%) compared to the control group (20% and 58%, respectively). This finding has several possible explanations. One possibility is that these objectively poor candidates were raising the ranks of the programs that had ranked them to match and thus were also not following a true-preference strategy. Another possible interpretation of this data is that these applicants may have had a prior relationship (eg, as a research fellow) with the program that had ranked them to match. Other programs may have felt that these applicants were therefore a "lock" with the programs they had a relationship with. As a result of this somewhat self-fulfilling

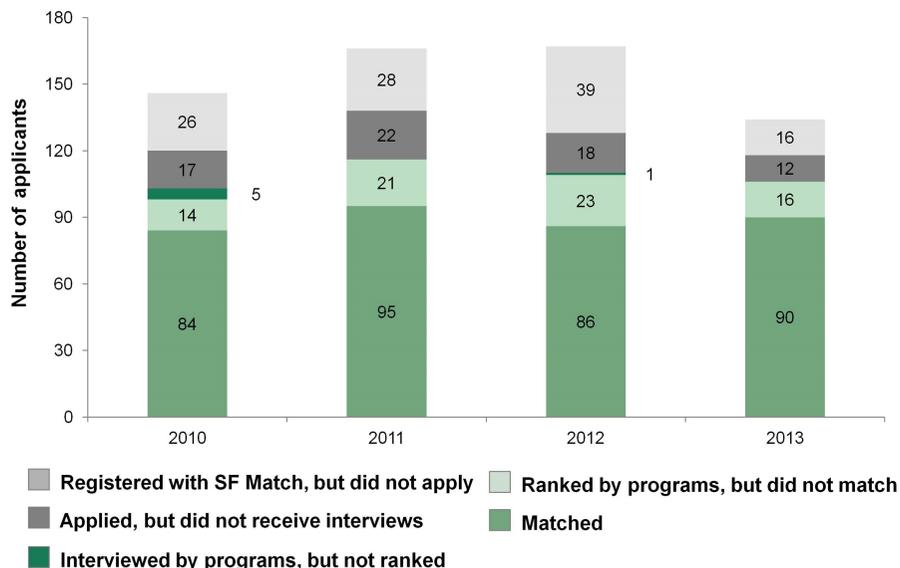


FIGURE 4. Breakdown of all registrants to the Plastic Surgery San Francisco Match for the 2010 through 2013 match years.

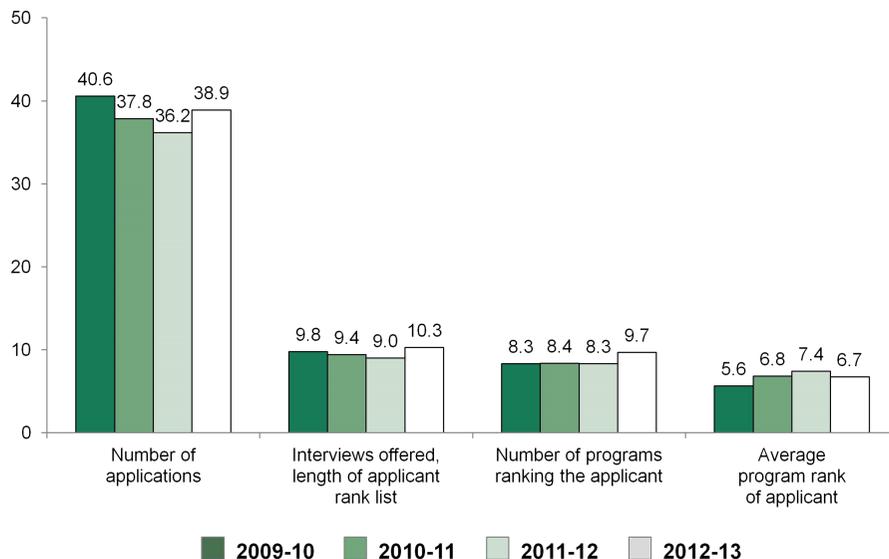


FIGURE 5. Mean number of applications, mean applicant rank list length, number of programs ranking the mean applicant, and the mean program rank of an applicant for the 2010 through 2013 match years.

prophecy, these applicants may have received worse ranks than they objectively deserved. Note that either of these 2 possibilities represents a shift away from the true-preference strategy by some of the programs involved.

The residency and fellowship match is a pressure-packed process. The stakes are high for both applicants and programs; the importance of finding a good residency position or a good cohort of residents cannot be overstated. The match introduces an element of uncertainty not present in the traditional (nonclearinghouse) hiring paradigm. Participants therefore value information about each other's preferences because it may decrease this uncertainty. There is some evidence that programs do not always follow the true-preference strategy. In a 2009 essay in *JAMA*, an NRMP Board member noted that program directors modify their rank lists to raise the rank of the applicant who filled their last open position and take particular pride in this metric.² This strategy involves giving candidates who preferred their program a higher rank than could be justified by

qualifications or interview performance. Anecdotally, interviewers sometimes ask applicants about their preferences and rank lists during interviews. Applicants, thinking that expressing enthusiasm could result in a better rank, regardless of their qualifications, feign great interest, even in programs they intend to rank low. In fact, Miller et al³ noted that applicants in the NRMP match who make misleading statements to programs tend to match at a higher rank. We have previously published survey data showing that 78% of applicants are contacted by programs in the postinterview period, and 42% of applicants consider this information important in their determination of a program's rank.⁴ Similarly, a recent survey of senior medical students at 7 US medical schools found that 23% of respondents changed their rank lists based on communications with programs.⁵ Thus, there is considerable survey-based evidence that applicants modify their rank lists based on program contact. Our results here provide some empirical evidence to support the conjecture that programs also fail to consistently follow the optimal true-preference

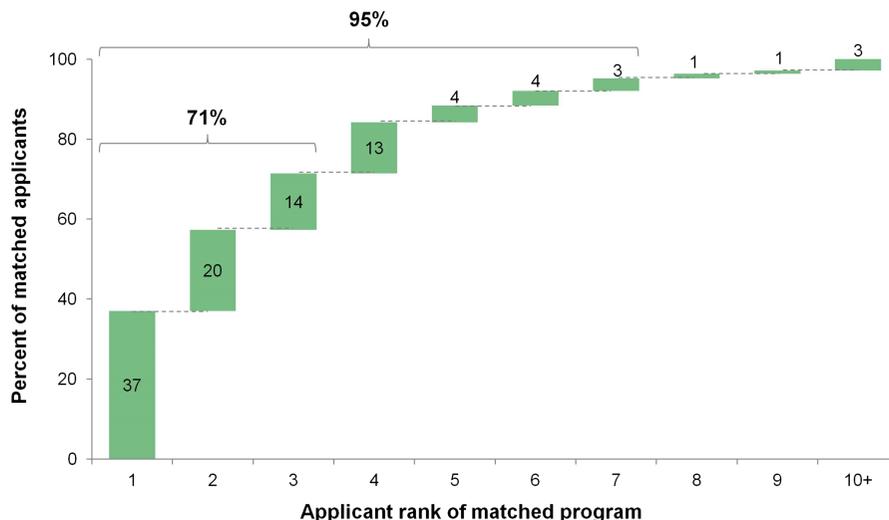


FIGURE 6. Distribution of matched applicants by rank of the program at which they matched, aggregated over the 2010 through 2013 match years.

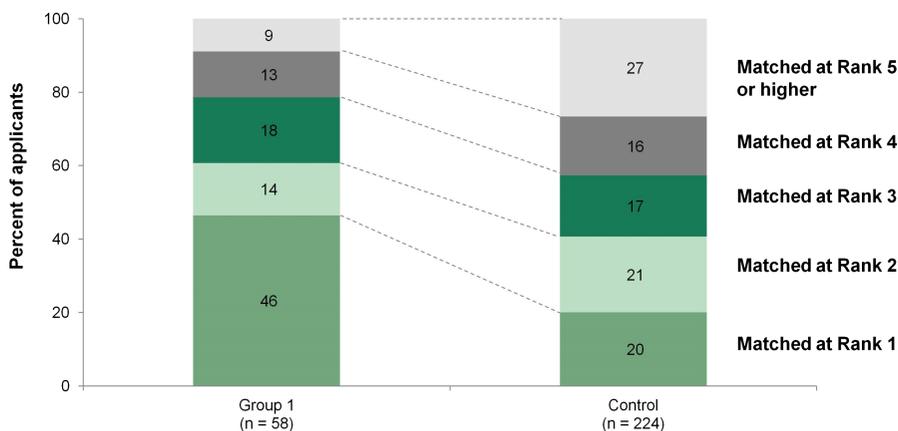


FIGURE 7. Comparison of the match outcome of a subset of applicants (those who were ranked to match by one program but very poorly ranked by the other programs where they interviewed) against a control group.

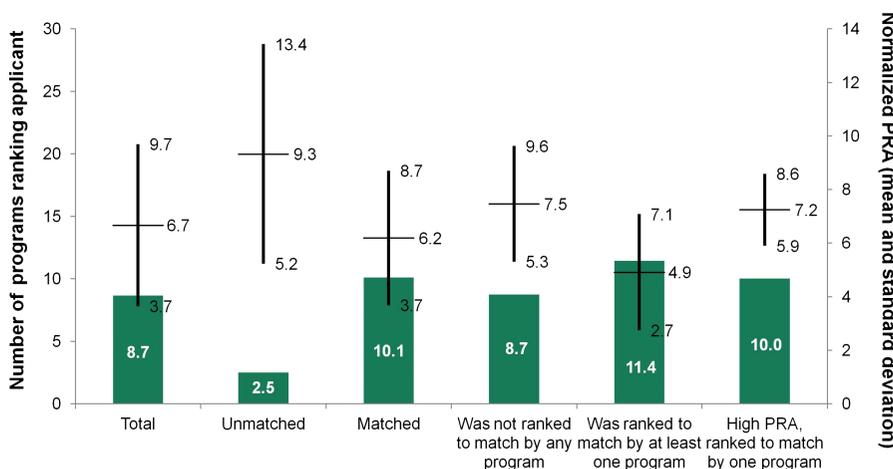


FIGURE 8. Mean number of programs ranking an applicant and the normalized mean program rank of an applicant for groups of applicants organized by match outcome.

rank list strategy. This is a highly relevant finding, since it has been shown that the true-preference strategy is guaranteed to provide the best possible result for both programs and applicants. As such, we hope these data provide programs with some motivation to re-examine their rank list creation process and ensure that they are truly following a true-preference strategy.

This study has some obvious limitations. First, we were unable to obtain any data from the NRMP, and so our conclusions are limited to the independent plastic surgery match. Further, we were only able to obtain 4 years of data, raising the possibility of sampling bias. Finally, our assessment of the quality of candidates was based purely on the relative ranks they received; since our data were deidentified, we were unable to associate candidates with more objective measures such as USMLE scores, ABSITE scores, research activity, and so on.

Future research will investigate the relative rank position of applicants across program rank lists to determine how consistently applicants are ranked relative to one another, and the effects that can be expected if all programs consistently followed a true preference strategy.

CONCLUSION

Although the independent match has been declining for the past decade, it has remained somewhat stable over the past 4 years

with regard to numbers of applicants and match rates. Our results show that there is significant inconsistency in the assessment of applicants by programs (evidenced by the high variability in ranks assigned to an applicant). We provide additional evidence that both programs and applicants may be attempting to reduce the uncertainty inherent to the match by modifying their rank lists away from a true preference list to one that will result in matching at a higher position on the list.

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