

[\[Print Version\]](#)

[\[PubMed Citation\]](#) [\[Related Articles in PubMed\]](#)

## TABLE OF CONTENTS

[\[INTRODUCTION\]](#) [\[MATERIALS AND...\]](#) [\[RESULTS\]](#) [\[DISCUSSION\]](#) [\[CONCLUSIONS\]](#) [\[REFERENCES\]](#) [\[TABLES\]](#)

doi: 10.2319/0003-3219(2008)078[0688:RBPTAC]2.0.CO;2  
*The Angle Orthodontist*: Vol. 78, No. 4, pp. 688–691.

# Relationship between Personality Traits and Cooperation of Adolescent Orthodontic Patients

Joaquín Amado;<sup>a</sup> Angela Maria Sierra;<sup>a</sup> Alejandro Gallón;<sup>b</sup> Cristina Álvarez;<sup>b</sup> Tiziano Baccetti<sup>c</sup>

## ABSTRACT

**Objective:** To establish the relationship between the personality traits of the adolescent and his or her cooperation with the orthodontic treatment.

**Materials and Methods:** From a sample of 70 adolescent orthodontic patients (46 girls and 24 boys) between 12 and 15 years of age (average age,  $13.4 \pm 1.1$  years), the patients' personality traits were evaluated by using a personality questionnaire (16 Personality Factors–Adolescent Personal Questionnaire) and the degree of patient cooperation was assessed through the cooperation test (Orthodontic Patient Cooperation Scale [OPCS]). The cutting point for the assessment of cooperation on the OPCS questionnaire (noncooperation vs cooperation) was carried out through the receiver operating characteristic (ROC) analysis of curves. A  $\chi^2$  test with Yates correction ( $P \leq .05$ ) was applied to evaluate the associations between the degree of cooperation and the scales of personality, gender, or age.

**Results:** The cutting point for cooperation as assessed by the OPCS by means of ROC analysis was 380. No statistically significant relations were found between the degree of cooperation and the scales of personality, gender, or age.

**Conclusions:** The results of the current study indicate that the personality traits alone of adolescents do not predict cooperation during treatment.

**KEY WORDS:** Adolescence, Personality, Cooperation, Orthodontic treatment.

Accepted: July 2007. Submitted: June 2007

INTRODUCTION [Return to TOC](#)

In orthodontic clinical practice, as well as in other dental specialties, success of treatment depends not only on factors such as an adequate diagnosis, the use of a precise and biocompatible biomechanical system, or the adequate response of the biological tissues but also on an additional variable: the patient's cooperation.<sup>1</sup> If the patient does not follow the recommendations provided by the clinician (hygiene, appointments, care of the appliances, use of elastics, etc), treatment duration may be longer, treatment outcome may be

incomplete, and the final result can be unpredictable or unsatisfactory.<sup>2,3</sup>

Most orthodontic treatments are carried out on adolescents because the prevalence of malocclusions increases between the ages of 11 and 16 years, making adolescents the population with the highest consultation rate.<sup>4,5</sup> Adolescence is a period in which important physical, social, and emotional changes appear. With regard to the adolescent patient and his or her relationship with cooperation, we must keep in mind that it can be affected by extrinsic factors (social stereotypes, gender, educational level, family) and by intrinsic factors (personality, temperament). These factors have been studied widely in the child and have resulted in concrete and successful techniques for the management of child cooperation.<sup>5</sup> Several studies have attempted to determine the degree of cooperation in the adolescent through several psychological methods according to age, social-economic strata, and family relationships.<sup>2,3,6</sup> These extrinsic factors are not susceptible to change by the clinician. Recently, new studies have appeared that have highlighted the personality characteristics as intrinsic factors that can intervene in a patient's cooperation during treatment.<sup>7,8</sup>

One of the ways in which psychology investigates the adolescent's personality is through psychometric methods.<sup>9</sup> These methods classify personality in terms of traits or factors. The Sixteen Personality Factors– Adolescent Personal Questionnaire (16PF-APQ)<sup>10</sup> is one of them, having a total of 200 elements (among which 114 on normal personality, 15 of occupational interest, and 40 on response to daily problems). This test has been validated for adolescents between 12 and 19 years of age.<sup>10</sup> In addition, to evaluate cooperation, various validated tests exist; among them, the Orthodontic Patient Cooperation Scale (OPCS)<sup>3</sup> is specifically designed for the orthodontic practice. The adequacy of this test has been demonstrated in adolescent orthodontic patients.<sup>3</sup>


The purpose of this study is to establish the relationship between the personality traits of the adolescent and his or her cooperation with the orthodontic treatment.

## MATERIALS AND METHODS [Return to TOC](#)

A descriptive, prospective, comparative study was carried out with a sample of 70 adolescents (46 boys, 24 girls) between 12 and 16 years of age undergoing active orthodontic treatment at the CES Clinic, Medellin, Colombia. The patients and their parents signed an informed consent, thus authorizing the application of the tests and the use of the obtained data for academic purposes.

### Inclusion Criteria

Patients of both genders between the ages of 12 years and 15 years 11 months in active orthodontic treatment (at least 4 months of treatment) and who provided informed consent signed both by parents and patients were included in the study.

The degree of cooperation was evaluated by the treating orthodontist by means of the OPCS questionnaire.<sup>3</sup> Orthodontists were given a list of 10 patient behaviors that are considered in evaluating a patient's cooperation. These 10 behaviors are incorporated into a 5-point Likert-type format ([Table 1](#) ) , with possible scores ranging from 10 (*lowest cooperation*) to 40 (*highest cooperation*). Five of the items were stated in a positive fashion and 4 in a negative fashion, according to Slakter et al.<sup>3</sup>

The personality questionnaire 16PF-APQ (114 questions regarding normal personality and 40 questions on daily problems, with three answer possibilities: false, true, questionable) was performed in all examined patients. The results were then processed, thus calculating the profile of the personality traits for each subject. The test included both a general response and information about specific traits (extroversion/introversion, adjustment/anxiety, receptive/harshness mentality, open/self-controlled, accommodating/ independent) for the definition of individual personality.

### Statistical Analysis

The SPSS statistical program version 12.0 was used (Statistical Package for the Social Sciences; SPSS Inc, Chicago, Ill) for data analysis. A receiver operating characteristic (ROC) curve analysis was carried out to establish the cutting point in the OPCS questionnaire between cooperative and noncooperative. The  $\chi^2$  test with Yates correction was used to evaluate the association between the presence/absence of cooperation and the personality traits as well as between cooperation and age and between cooperation and gender. The alpha level of significance was set at  $P < .05$ .

## RESULTS [Return to TOC](#)

The analysis of the ROC curve for the 70 orthodontic patients determined that the cutting point between cooperative and noncooperative using the OPCS questionnaire and Likert-type scale was equal to 380: a score smaller than 380 was considered noncooperator, and a score equal to or greater than 380 was considered as cooperator. This cutting point guaranteed a specificity of 91% and a sensitivity of 100%.

The outcomes of the cross-tabulation between the cooperation variable and the variables of personality did not show any statistically significant differences. When analyzing individual traits within the general model, the extroversion variable showed that 90% of the noncooperating patients and 58% of the cooperating patients had the variable characteristics (introverted, extroverted) within the average ranges. When introverted and extroverted patients were evaluated independently, it was found that 34% (17) of the introverted patients cooperated and 5% (1) did not cooperate, while in the extroverts, no statistically significant differences were found (8% cooperators, 5% noncooperators).

As for the anxiety variable, 65% (13) of the noncooperating patients and 70% (35) of the cooperating patients had the characteristics of the variable (anxious, adjusted) within the average range. When the adjusted and anxious patients were evaluated independently, it was found that 12% (6) of the adjusted patients were cooperators and 20% (4) were noncooperators, while in the anxious patients, no statistically significant differences were found (18% cooperators, 15% noncooperators).

For the harshness variable, 80% (16) of the noncooperating patients and 82% (41) of the cooperating patients had the variable characteristics (receptive vs hard mentality) within the average range. When the receptive and harshness mentality patients were evaluated independently, it was found that 10% (5) of the receptive patients were cooperative and 10% (2) were noncooperative; of the hard mentality patients, 8% (4) were cooperative and 10% (2) were noncooperative, meaning that for both characteristics, no statistically significant differences were found.

As for the self-control variable, 85% (17) of the noncooperative patients and 36% (36) of the cooperative patients had the variable characteristics (uninhibited, self-controlled) within the average range. When the uninhibited and self-controlled patients were evaluated independently, it was found that 8% (4) of the open patients were cooperative and 5% (1) were noncooperative, meaning that no statistically significant differences were found; similarly, in the self-controlled group, 20% (10) of the patients were cooperative and 10% (2) were noncooperative.

Finally, for the independence variable, 55% (11) of noncooperative patients and 78% (39) of cooperative patients had characteristics of the variable (accommodating, independent) within the average range. When the accommodating patients and independent patients were evaluated, it was found that 4% (2) of the accommodating patients were cooperative and 15% (3) were noncooperative (no statistically significant differences); in the independent group, 18% (9) of the patients were cooperative and 30% (6) were noncooperative.

Regarding the associations between cooperation and gender or age variables, no significant differences were found (values of  $P = .09$  and  $.8$ , respectively).

## DISCUSSION [Return to TOC](#)

Several authors<sup>2,3,11,12</sup> have demonstrated that cooperation is an important factor in the success of orthodontic treatment, and they have tried to establish the relationships of cooperation with external variables such as social stereotypes, gender, educational level, and family. Internal factors such as personality have also been taken into consideration, mainly in young adults.<sup>7,11</sup> This study attempted to establish the relationship of cooperation with the personality traits of the adolescent orthodontic patient by using a validated personality test and cooperation scale, the 16PF-APQ<sup>10</sup> and the OPCS.<sup>3</sup>

Although no statistically significant differences were found for any of the traits, when crossing these traits with the variable cooperation, it appeared that introverted patients presented a tendency to be more cooperative during the orthodontic treatment. Bos et al<sup>7</sup> used a predictor of personality characteristics (5 Personality Factors Test [PFT]) and the Scale of General Cooperation in 75 women and 31 men with an average age of 20 years, and they found significant correlations within some personality traits but not between these traits and cooperation with the orthodontic treatment. The outcomes of the current study agree with the results of Bos et al,<sup>7</sup> in that personality characteristics on their own do not predict cooperation in orthodontics. Compliance during orthodontic therapy is probably affected by multiple variables that may be related to the patient's motivation and the management skills of the operator.<sup>8</sup>

Cucalon and Smith<sup>2</sup> indicated that the most important variable to predict cooperation was gender, with females exhibiting a significantly higher level of cooperation with orthodontic therapy. Southard et al<sup>9</sup> found also that females were more cooperative when the Millon Adolescent Personality Inventory was applied to adolescent patients. On the contrary, in the present study, no statistically significant differences regarding cooperation were found between females and males. However, the evaluation criteria issued by the orthodontist responsible for the patients in this study showed a definite perception that females cooperate more. The paucity of the literature in this regard should be emphasized as well.

Regarding the age variable, Allan and Hodgson<sup>11</sup> reported a study in which patients' cooperation was predicted using standard personality measurements. The study consisted of 30 subjects (13 boys and 17 girls) ranging in age from 12 to 18 years from middle-class families who were undergoing orthodontic treatment for a minimum of 1 year. The researchers found that the best predictor of the patient's cooperation was age, with the youngest ones being the most cooperative. In the same way, Weiss and Eiser<sup>12</sup> concluded that patients 12 years and younger were more cooperative than the older patients; however, regarding the compliance with appointments and appliance care, even the younger patients were poor cooperators. The outcomes of the present study confirm the contradictions and uncertainty of

the study by Weiss and Eiser,<sup>12</sup> thus indicating that cooperation may not be correlated significantly with the evolution in personality and physical development.

None of the previously mentioned studies nor the current one are conclusive regarding the definite role of personality traits in a patient's cooperation. However, even though these characteristics cannot be regarded as the only factor to predict cooperation, they can be still part of a combination of other factors such as extrinsic ones (social-economic characteristics, parents' personality, etc), factors related to the orthodontist (motivation, personality, experience), and factors related to the relative interactions between all the characters involved in the equation (patient, parents, orthodontist) in terms of empathy, surrounding environment, office and personnel disposition, and so forth. Following an evaluation of the legal-medical problems in orthodontics, Rodríguez<sup>13</sup> concluded that the main source of legal action is the failed relationship between the orthodontist and the patient because of the inability of the orthodontist to motivate the patient to treatment by appropriate identification and use of the patient's type of personality.

## CONCLUSIONS [Return to TOC](#)

- Patient's personality traits do not predict cooperation during the orthodontic treatment.
- Age and gender were not statistically significant variables in relation to compliance, although there was a tendency for improved cooperation at earlier ages (12–13 years) and in female patients.

## REFERENCES [Return to TOC](#)

1. Annrup K, Broberg AG, Berggren U, Bodin L. Treatment outcome in subgroups of uncooperative child dental patients: an exploratory study. *Int J Paediatr Dent.* 2003; 13:304–309. [[PubMed Citation](#)]
2. Cucalon A, Smith R. Relationship between by adolescent orthodontics patients and performance on psychological test. *Angle Orthod.* 1990; 60:253–289.
3. Slakter MJ, Albino JE, Fox RN, Lewis EA. Reliability and stability of the Orthodontic Patient Cooperation Scale. *Am J Orthod.* 1980; 78:559–563. [[PubMed Citation](#)]
4. Bishara S. *Ortodoncia*. New York, NY: McGraw-Hill; 2001.
5. Onyeaso CO, BeGole EA. Orthodontic treatment need in an accredited graduate orthodontic center in North America: a pilot study. *J Contemp Dent Pract.* 2006; 7:87–94.
6. Clemmer EJ, Hayes EW. Patient cooperation in wearing headgear. *Am J Orthod.* 1979; 75:517–524. [[PubMed Citation](#)]
7. Bos A, Hoogstraten J, Prah-Andersen B. On use of personality characteristics in predicting compliance in orthodontic practice. *Am J Orthod Dentofacial Orthop.* 2003; 123:568–570. [[PubMed Citation](#)]
8. Agar U, Dorul C, Bicakci AA, Bukusoglu N. The role of psycho-social factors in headgear compliance. *Eur J Orthod.* 2005; 27:263–267. [[PubMed Citation](#)]
9. Southard K, Tolley E, Arheart K, Hackett-Renner C, Southard T. Application of the Millon Adolescent Personality Inventory in evaluating orthodontic compliance. *Am J Orthod Dentofacial Orthop.* 1991; 100:553–561. [[PubMed Citation](#)]
10. Schuerger JM. *Cuestionario de Personalidad Para Adolescentes (Manual)*. Barcelona, Spain: Ed Tea; 2003.
11. Allan TK, Hodgson EW. The use of personality measurements as a determination of patient cooperation in an orthodontic practice. *Am J Orthod.* 1968; 54:433–440. [[PubMed Citation](#)]
12. Weiss J, Eiser HM. Psychological timing of orthodontic treatment. *Am J Orthod.* 1977; 72:198–204. [[PubMed Citation](#)]
13. Rodríguez MC. Insatisfacción en ortodoncia. *Rev Med-Legal.* 2006; 4:17–22.

---

## TABLES [Return to TOC](#)

**Table 1.** Five-Point Likert-Type Scale Used for Scoring Cooperation in Adolescent Orthodontic Patients<sup>3</sup>

---

## Orthodontic Patient Cooperation Scale

---

Please read the following list of behaviors, keeping in mind the patient named on the cover sheet accompanying this questionnaire. For each item, decide to what extent the statement describes the patient's behavior. Then circle the response that most closely reflects your estimate of the patient's behavior.

1. This patient keeps appointments and is prompt.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

2. This patient has distorted wires and/or loose bands.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

3. The parent(s) of this patient is (are) observed to be interested and involved in treatment.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

4. This patient speaks of family problems or a poor relationship with parent(s) or demonstrates such problems in interactions with parent(s), which I have observed.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

5. This patient acts enthusiastic and interested in treatment.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

6. This patient's behavior is sullen, hostile, belligerent, or rude.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

7. This patient cooperates in the use of headgear and/or elastics.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

8. This patient complains about treatment procedures.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

9. This patient demonstrates excellent oral hygiene.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

10. This patient complains about having to wear braces.

*Always*      *Frequently*      *Sometimes*      *Rarely*      *Never*

---

<sup>a</sup> Research Fellow, Department of Orthodontics, CES University, Medellin, Colombia

<sup>b</sup> Assistant Professor, Department of Psychology, CES University, Medellin, Colombia

<sup>c</sup> Associate Professor, Department of Orthodontics, University of Florence, Florence, Italy; Thomas M. Graber Visiting Scholar, Department of Orthodontics and Pediatric Dentistry, School of Dentistry, University of Michigan, Ann Arbor, Mich

Corresponding author: Tiziano Baccetti, DDS, PhD, Università degli Studi di Firenze, Via del Ponte di Mezzo, 46-48, 50127, Firenze, Italy  
(E-mail: [t.baccetti@odonto.unifi.it](mailto:t.baccetti@odonto.unifi.it))

