Evidence of Post-formal Thinking Among College Students

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Abstract

This study analyzed the effects of age, personality factors and experience in competitive collegiate debate on the ability to think post-formally. College students (N=80) completed a Post-formal thinking questionnaire (modified version of a questionnaire by Sinnot, 2005) and a personality inventory. This was an ex post facto study, the subjects being divided into four groups based on their age (younger/older) and debate experience (debaters/non-debaters). Although both younger and older debaters scored higher on the post-formal thinking measure than non-debaters, and older students scored on average higher than younger students, the differences were not statistically significant. A significant correlation between post-formal thinking and the Big Five trait Openness to Experience has been found. Another important result was that Openness to Experience and Conscientiousness combined can be used to predict the post-formal score. In terms of personality differences between debaters and non-debaters, an interesting finding was that debaters were on average more open to experience, but less agreeable than non-debaters. A finding that complicates the process of explaining post-formal thinking is the interaction between age and personality traits. This study found that younger students were significantly more extraverted and significantly less neurotic than older students.

Keywords: Post-formal thinking, college students, personality traits.

1. Introduction

The view of human development as made up of stages rests on the assumption that there are distinct, specific periods of evolution in one’s personality, each characterized by a group of behaviors of similar complexity. Whether these can be explained through maturation or through the effects of the environment, the fact remains that certain capabilities are considered to be possible only at their corresponding stage. This notion of stage is conceptualized in association with the notion of a hierarchy of complexity, each stage being defined as a superior integration of previous stages. If certain behaviors are present, then all their prerequisite behaviors can be inferred to have been acquired. Therefore, evidence that behaviors considered very complex appear before some of their lower-level prerequisites would contradict this linear model of development.

Cartwright overviews the evolution in the field of cognitive developmental psychology from the initial, stage-based model proposed by Jean Piaget. Cartwright asserts that the more recent post-formal theories of cognitive development better reflect the impact of individual differences, social interaction and specifics of each domain of knowledge on cognitive development. The distinctive feature of these theories is that they seem to provide a better account of the diversity of approaches to knowing in adulthood than did Piaget’s theory, which viewed formal thinking reached in young adulthood as the universal peak and endpoint of the cognitive progress. By supporting the view that learning continues throughout the lifespan, that improvements across different domains may have different rates and that the individual depends on the social environment to develop, post-formal theories offer society constructive ways to capitalize on the education of adults.
The construct of post-formal thinking is associated with the highest stage of adult cognition, characterized by a number of aspects. Some of the most important ones were identified by Sinnott: “ability to shift back and forth between abstract thinking and practical, real-world considerations”, ability to identify “multiple causality and multiple solutions” of problems, pragmatism (“ability to choose the best of several possible solutions and to recognize the criteria for choosing”), awareness of paradox (“recognition that a problem or solution involves inherent conflict”).

Sinnott wrote that theories of post-formal thinking have gathered enough preliminary empirical support to enter a new phase in their development: the correlational-experimental phase. The following study can be integrated in this phase of applying the theories and of testing different variables that may be associated with post-formal thinking.

First, an overview of the different avenues in explaining the emergence of the post-formal phase is necessary. According to Cartwright, the typical, stage-based approach viewed post-formal thinking as a phase that builds on the foundation of formal thinking, but transcends it qualitatively.

An alternative explanation was to show that the progress in the complexity of one’s thinking can not be explained only through cognitive processes. Evidence that personality traits have an effect on reaching certain stages of thinking means that different individuals may go through stages in different orders and at different rates and even that what is characterized as a stage of thinking may simply refer to the way thinking is integrated with personality at different moments, which would be an extra-cognitive reality.

Endler argued that personality and cognition are studied separately for methodological reasons, whereas in fact the entities they study overlap. Endler provides an example that is relevant to the present study: the Openness factor included in the Big Five model may assess aspects of intelligence. The researcher further mentions a variety of areas of research at the intersection of personality and cognition: social learning theories, research into cognitive styles, cognitive personality theories.

More specific literature relating certain personality factors and thinking can be found. Friedman studied undergraduate and graduate female students in the field of education and found that personality traits like autonomy, creativity, empathy or altruism are likely to facilitate the so-called post-formal stages of thinking. Formal education has also been found to promote “reflective judgment”, emphasizing an acquired component of the skills grouped under post-formal thinking.

Abundant research exists that supports a relationship between personality traits and thinking style. Toomela mentions studies done by Allik and Realo, Beier and Ackerman, Paunonen and Ashton, which correlate personality dimensions and intelligence. Another important interdependence mentioned by Toomela is the fact that cognitive processes influence the expression of personality.

A widely used personality model is the five-factor model, supported by Costa and McCrae:

Many psychologists are now convinced that the best representation of trait structure is provided by the five factor model (FFM; Digman, 1990; but see Block, 1995, for a dissenting view). According to the FFM, most personality traits can be described in terms of five basic dimensions, called Neuroticism versus Emotional Stability (N); Extraversion or Surgency (E); Openness to Experience or Intellect, Imagination, or Culture (O); Agreeableness versus Antagonism (A); and Conscientiousness or Will to Achieve (C).

This model has been found to have cross-cultural validity, suggesting the possibility of a universal personality structure.

Previous research found that Openness to Experience and Conscientiousness correlate positively with rationality measured by the REI scale (Rational-Experiential Inventory), whereas Neuroticism correlated negatively with rationality. Conscientiousness was found to correlate positively with problem solving and negatively with intellectual avoidance as measured by the TIE – Typical Intellectual Engagement- scale.

Considering the extensive literature on the relationships between thinking and personality traits, it was surprising to find a research gap related to the effects of specific personality factors on post-formal thinking.

2. Age and Post-formal Thinking

Another approach to explaining the post-formal phase is that of looking at age differences. Blanchard-Fields analyzed the differences between adolescents and young adults in the area of post-formal thought and discovered them to be more frequent in “emotionally salient” and “socially meaningful” contexts. This supports the idea that the purely cognitive differences between the two ages are not as important as the emotional differences. In “emotionally salient” situations, adolescents’ thinking seems to be distracted or distorted. In situations with low “emotional
saliency”, adolescents and young adults performed the same. Although age started to become a factor when comparing adolescents with older adults, the author of the study concluded that age itself was not as important as the differences in ego development, which tended to be associated with progress in reasoning abilities.

Sebby and Papini found similar results with Blanchard-Fields. Their study proposed that “problem relevancy” may disrupt the adolescents’ ability to think post-formally. They started with the observation that the moral dilemmas presented to subjects in previous studies of post-formal thinking had been far from the daily experiences of adolescents and more familiar to the adult subjects to begin with. When they presented adolescents with problems and dilemmas that were closer to the typical range of experiences for adolescents, they noticed significantly fewer differences between adolescents and adults in post-formal thinking.

Research also shows that emotional development and cognitive development become increasingly inter-related with age. With increasingly complex thoughts, individuals become more capable to differentiate between their feelings, but also capable of more complex feelings, directed towards abstract entities. Labouvie-Vief proposed a curvilinear relationship between cognitive-affective integration and emotional activation. At moderate levels of emotional activation, a person is most capable to integrate thoughts and feelings. At low or very high levels of emotional activation, integration of feelings with thoughts decreases. This researcher argues that post-formal thinking and the ability to integrate emotions and thoughts are linked to defense and coping mechanisms, and therefore to overall well-being and fulfillment, making the research into post-formal thinking important for many fields of psychology –cognitive, educational, clinical, etc.

3. Post-formal Thinking and Socio-cultural Domains

An important area that has been explored is how the post-formal stage develops across different domains. Demetriou and Charitides mention the literature that shows the Piaget stages can not fully explain the development of moral, legal or political thinking. These studies all emphasize the importance of the social world in the individual’s ability to develop formal thinking in these areas. The results in Demetriou and Charitides’ study showed that although formal thinkers were more likely to be able to grasp concepts of justice, the stage of cognitive development was not the only variable involved, since some post-formal thinkers failed to have the higher understanding of justice that others had. Age was not found to have a significant effect on the ability to think about justice at a higher stage.

The following study explored the effect of experience with debate, a social and educational activity that stimulates the key thinking patterns described by the post-formal theories. In this activity, students are trained to think of multiple reasons for and against any argument, to create different causal scenarios in order to explain a phenomenon and to test different persuasive strategies which can be used with the same argument. Debate experience has been defined in this study as number of years of performing in one of the following types of structured debate competitions: policy debate, Lincoln-Douglas, parliamentary debate.

In a sociological study, Fine describes the world of academic debate. Talking about the dimensions of this activity, he says:

An argument is not something that happens in isolation, but that happens in a social and strategic context. Humans situate themselves in social life through argument, creating allegiances and divisions. (…) Argumentation is as social as it is cognitive, a linkage of the mind to systems of interaction. (…) As high school [and college] debate makes it clear, it is people, not minds, that make arguments. (pp.6)

This activity promotes an awareness of the relativity in the process of constructing knowledge, of the pragmatic goals of reasoning, of the inherent tensions between certain concepts, etc., which are aspects emphasized by the theorists of post-formal thinking. If debate practice is an important variable associated with higher abilities to reason post-formally in first-year college students, then it would be evidence that post-formal thought can be learned through this type of social interaction.

The following study explored the three above-mentioned areas of explanation for the development of post-formal thinking: personality factors, age and a socio-cultural factor: debate experience. The study was designed to answer the following questions: (a) Which personality factors can be correlated with post-formal thinking? (b) Do older college students possess a higher level of post-formal thinking? (c) Is there a difference between debaters and non-debaters in terms of personality factors and post-formal thinking?

4. Method

80 college students were recruited to participate in the study, equally distributed among four categories: younger debaters (mean age 18.5), younger non-debaters (mean age 18), 20 older debaters (mean age 21.9) and 20 older non-
debaters (mean age 22). Convenience sampling was used predominantly. Younger students attending their introductory courses such as Introduction to Psychology, Introduction to Sociology, Introduction to International Relations and Introduction to Political Science and older students attending 300 and 400 level courses in Psychology (such as Abnormal Psychology and Research Methods) were asked to participate. Not all persons solicited agreed to dedicate 5 to 10 minutes of their time before the beginning of class for filling out the two surveys. Debaters were asked to participate during two official tournaments that took place in November 2005. Convenient, haphazard sampling was used in this instance as well. The data collected from 7 participants were removed, due to the fact that the surveys were incomplete or misunderstandings occurred.

The four samples were especially created for a 2 X 2 design, with the two independent variables being age group (younger or older) and debate status (the two levels of the variable were non-debater, coded as 1 and debater, coded as 2). The dependent variable was post-formal thinking, as measured by the Post-formal thinking Questionnaire.

The participants had to circle the answer to each of the 48 questions, the first 40 being part of a personality measure – the Big Five Personality Test – in the form developed by U.C. Berkeley psychologist John21, which is available online. This inventory followed Costa and McCrae’s model closely, focusing on the same five traits: Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience. Each sequence of five items targeted these traits, in the above-mentioned order, so there were a total of eight items for each trait. The items were scored according to a 5-point Likert scale, ranging from 1 (Disagree) to 5 (Agree). Not all items were phrased positively, measuring the trait directly. For example, item number 6 stated:

I see myself as someone who is reserved.
Disagree 1 2 3 4 5 Agree

This was the second item measuring extraversion. If the subject chose to circle 4, a score of 2 was added to the total Extraversion score. The same procedure was followed for all reversed items. Table 1 shows the irregular pattern for the reversed items (marked with -).

Table 1. Reversed items in the Big Five Personality Test

<table>
<thead>
<tr>
<th>Extraversion</th>
<th>Agreeableness</th>
<th>Conscientious</th>
<th>Neuroticism</th>
<th>Openness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. +</td>
<td>2. -</td>
<td>3. +</td>
<td>4. +</td>
<td>5. +</td>
</tr>
<tr>
<td>26. +</td>
<td>27. -</td>
<td>28. +</td>
<td>29. +</td>
<td>30. +</td>
</tr>
<tr>
<td>31. -</td>
<td>32. +</td>
<td>33. +</td>
<td>34. -</td>
<td>35. -</td>
</tr>
</tbody>
</table>

Note. A “+” means that the item was scored directly, whereas a “-“ meant that the value added was not the one circled (x), but the one obtained with the formula 5-x+1.

The second instrument used was the Post-formal Questionnaire, which was initially made up of 10 items, but was eventually used in a reduced form of only 8 items. A pilot study conducted on 13 subjects revealed that two of the items were almost unanimously considered confusing. These were I see the paradoxes in life/I see life as a coherent flow and Some people’s actions make no sense to me/I always see the hidden logic in people’s actions.

Each of the items was scored on a 7-point Likert scale and transformed from a Post-formal Thinking Questionnaire developed by Sinnott (obtained directly from the author, 2005). Here is an example of an original item:

I see more than one method that can be used to reach a goal.
7 6 5 4 3 2 1

To avoid a possible social desirability bias, the opposite for each statement was introduced, forcing the subject to actively choose whether this statement applies to them. To avoid the same bias, each odd-numbered item was scored in a reversed way. The transformed version of the item was:
5. Results

The mean scores obtained on the Post-formal Thinking Questionnaire by the four groups are shown in Table 2.

Table 2. mean scores on the post-formal thinking measure

<table>
<thead>
<tr>
<th></th>
<th>Younger</th>
<th>Older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debaters</td>
<td>36.1</td>
<td>38.2</td>
</tr>
<tr>
<td>Non-debaters</td>
<td>35.8</td>
<td>37.9</td>
</tr>
</tbody>
</table>

Note. Maximum possible score was 56, minimum was 7.

The 2-way Analysis of Variance test revealed no statistically significant main effects on post-formal thought. The F value for the main effect of age group on post-formal thought was F=2.43, with p=.12 and the effect of debate status on post-formal thought was also not significant: F=.05, p=.82. There was no interaction effect between age group and debate status (F=.00, p=1.00). However, the means follow the anticipated trend: older students scored higher than younger students, and debaters scored higher than non-debaters, making older debaters score on average the highest and younger non-debaters score on average the lowest.

The correlation between age and post-formal thought was positive and low, with Pearson’s r =.122, and a level of significance of .283. For the correlation between the number of years of debate experience and post-formal thought, Pearson’s r was found to be equal to .121, with Sig.=.285.

A T test for independent samples showed no significant statistical difference between the post-formal scores of males and females (t =.039, for df=78, p=.97).

Correlation coefficients were calculated for each pair of a Big Five trait and post-formal thought. There was a large, positive correlation between Openness to Experience and post-formal thought (Pearson’s r =.412, significant at the 0.01 level, 2-tailed). For the other pairs of variables, the r values were small: Extraversion and post-formal thought returned: r =.026, Sig. =.82; Agreeableness and post-formal thought returned r =.101, with Sig. =.37; Conscientiousness and post-formal thought returned r =.131, Sig. =.25; Neuroticism and post-formal thought returned r = -.016, with Sig. =.89.

Correlations were also calculated for each possible pair of Big Five traits, in order to discover whether the variables are independent, like they are defined in the literature. There were two significant correlations found: between Openness and Extraversion (r=.233, Sig. =.038, on a 0.05 level) and between Neuroticism and Extraversion (r = -.340, Sig. =.002, negative correlation which is significant even at the very stringent level of 0.01).

T tests for independent samples were conducted to find out if there are personality differences between debaters and non-debaters. A significant statistical difference was found on the Agreeableness sub-scale, with a t = 4.025, Sig. =.000, 2-tailed. The mean score of non-debaters was significantly higher (32.90, compared to 28.23). The difference between debaters and non-debaters in Openness to Experience was almost statistically significant (t =1.890, Sig. =.062, 2-tailed), with debaters scoring on average higher than non-debaters (30.83, compared to 29.13).

Five independent samples T tests were also performed with the independent variable being the age group (dividing the 80 subjects into two equal groups, younger and older) and the dependent variable being each of the personality traits. Younger students were found to be significantly more extraverted (t =2.895, df=78, Sig. =.005) and significantly less neurotic (t =2.284, df=78, Sig. =.025). No significant statistical differences were found with regard to Agreeableness (t =.333, Sig. =.740), Conscientiousness (t =1.364, Sig. =.176) or Openness to Experience (t =1.109, Sig. =.914).

Multiple regression analysis was conducted to analyze which pairs of personality factors would predict the post-formal score. A large multiple correlation (R= +.415) was found between the pair Openness and Conscientiousness and post-formal score. R square was .172, so the two variables combined predict 17.2% of the amount of variability.

I think there is a sure method to reach any goal; it’s just a matter of finding it.

I see more than one method that can be used to reach a goal.
in post-formal scores. No other combination of two personality factors resulted in a medium or high coefficient of correlation with the post-formal score.

Another way to predict the post-formal score was by using Openness and age group combined (R = .450), with 20.2% of the variability of post-formal scores explained by the two variables. No other combination of age group and a personality factor resulted in medium or high multiple correlation with the post-formal score. Also, number of debate years paired with each of the personality factors did not predict enough of the post-formal score to be mentioned (debate years alone predicted only 1.5% of the variability of post-formal scores).

6. Discussion

The first question that the present research aimed to answer was: (a) Which personality factors can be correlated with post-formal thinking? This study found a significant positive correlation between Openness to Experience and post-formal thinking, supporting the literature which shows that personality factors are related to and overlap with thinking style. The result is particularly consistent with the observation made by Endler that Openness to Experience overlaps with aspects of intelligence. Another important result was that Openness to Experience and Conscientiousness combined can be used to predict the post-formal score. It is possible that more refined measures on all of the variables and larger samples could increase the proportion predicted to more than 17.2% as was found in this case. Age group and Openness to Experience combined were also a relatively good predictor for the post-formal score, accounting for 20.2% of the amount of variability of post-formal scores. Based on this study, Openness could be considered independent from age, as their correlation was very weak and the T test showed no significant differences between the two age groups in terms of the score on the Openness scale. An interesting finding was that two pairs of personality factors correlated strongly, despite the fact that McCrae and Costa defined and empirically supported the fact that the five factors are independent. The present study found that students who are more open to experiences are also more likely to be more extraverted, whereas students who are more neurotic are less likely to be extraverted, or more likely to be introverted.

The second objective of the study was to find out if (b) older college students possess a higher level of post-formal thinking and (c) there is a difference between debaters and non-debaters in terms of personality factors and post-formal thinking. The lack of statistically significant main effects of age and debate experience on post-formal thinking could be attributed to sample sizes being too small or to the fact that the post-formal questionnaire is not sensitive enough to detect the differences. There are only eight items on the constructed survey and the items are phrased in a very abstract way, which could limit the subjects’ ability to assess their thinking style with precision on the 7 to 1 continuum. The fact that there were weak, but positive correlations between age and post-formal thinking, and debate experience and post-formal thinking encourages the conclusion that further research could overcome the above-mentioned limitations and detect significant effects. The mean scores on the post-formal thinking measure follow a trend that supports the same conclusion. In terms of personality differences between debaters and non-debaters, an interesting finding was that non-debaters are more agreeable than debaters, a trait which is defined as the predisposition to be pro-social, trusting, altruistic. However, debaters scored on average higher on Openness to Experience, which is a measure of “the breadth, depth, originality, and complexity of an individual’s mental life.”

Apart from overcoming some of the discussed limitations, further research should try to explore different socio-cultural factors, such as level of education, and maybe include subjects with less formal education. Also, shedding more light on the complex inter-play between personality traits, age and cognition would help in assessing the usefulness of the construct of post-formal thinking.

7. References

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