

Influence of Adolescent Peer Status on Critical Thinking Test

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Abstract

The influence of adolescent peer status on critical thinking test was investigated using 615 Senior Secondary II students (299 males and 316 females) with age range of 15 to 21 years ($\bar{X} = 17.56$; $SD = 2.19$). Instruments used were Rating and Nomination Sociometric Scale for peer assessment; The Test of Critical Thinking, Form G and Eysenck General Intelligence Test 4 (EGIT-4). A one-way Analysis of Covariance, using general intelligence as the covariate revealed a significant difference in critical thinking scores among peer status conditions [$F(2,611) = 27.57$, $p < .001$]. Follow-up test using the Bonferroni procedure showed that adolescents with popular peer status ($\bar{X} = 14.36$) had significantly higher critical thinking scores, controlling for the effect of their general intelligence, than those with rejected peer status ($\bar{X} = 12.22$, $ES = .71$) and those with neglected peer status ($\bar{X} = 13.04$, $ES = .44$). Results were discussed in relation to the behavioural correlates of peer status and cognitive gains of social interaction.

Keywords: Adolescent peer status; critical thinking; general intelligence

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Some conceptualizations of critical thinking have clearly brought to bear the purpose and intention of critical thinking. For example, to decide what to believe or do (Ennis, 1985) and to improve the quality of thinking and impose intellectual standards on them (Paul & Elder, 2004). Ability or skill and disposition have also been recognized as necessary for critical thinking. Abilities are the actual cognitive abilities that are required to think critically and which include: focusing on a problem, analyzing arguments, making inferences using inductive or deductive reasoning, and reasoning dialectically in such a way as to determine when one's own point of view is at its weakest, and when an opposing point of view is at its strongest (Harris, 2001; Paul, 1992). Dispositions are traits or habits or characters that define the critical spirit and which motivates a person to apply critical thinking skills in a thinking task. They include the disposition to inquisitiveness, open-mindedness, truth seeking, fair-mindedness, flexibility, the propensity to seek reason, and the desire to be well-informed (Ennis, 1985; Facione, 1990).

More importantly however is the conceptualization of critical thinking as a set of cognitive processes. For example, critical thinking has been defined as "...the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to

describe thinking that is purposeful, reasoned, and goal directed – the kind of thinking involved in solving problems, formulating inferences, calculating likelihood, and making decisions when the thinker is using skills that are thoughtful and effective for the particular context and type of thinking task” (Halpern, 1996, p. 5.) or as “...purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference, as well as explanation of the evidential, conceptual, methodological, criteriological or contextual considerations upon which that judgment is based” (Facione, 1990, p. 3). Conceptualizing critical thinking as a set of cognitive processes has led to an application of direct teaching and evaluation of critical thinking skills (Facione, 1996) and also an increased need to determine how ‘general critical thinking’ develops because sets of dispositions and general skills that conceptualize critical thinking are combined into a process. General critical thinking comprise critical thinking inherent in “general knowledge” that is not domain specific and based on the premise that exemplary standards of critical thinking (clarity, precision, accuracy, depth, adequacy, relevance, completeness, and fairness) apply to good thinking in any domain and in everyday reasoning (Paul, 1993).

What facilitates the development and maintenance of critical thinking in adolescents? It has long been recognized that higher scientific learning has both a cognitive process which involves the individuals knowledge construction and a social process that involves significant others in this construction (Cobb, 1994). From the social constructivist view, the interest is in the role of overt, observable processes of interpersonal interaction in shaping the child’s cognition. Thus Vygotsky (1978) argues that when adolescents interact, it is not only information that is internalized but also the fundamental cognitive processes that are implicit in the communications. Accordingly, one person profits from the very acts of questioning, challenging and providing feedback while the other profits from the act of reconstructing knowledge from asking questions and responding to challenges. Inhelder and Piaget (1958) in their discussion of adolescent thinking cited the tendency to “congregate in peer group” as a primary source of “intellectual decentering” because “it is most often in discussion between friends, when the promoter of a theory has to test it against the theories of others, that he/she discovers its fragility” (p.346). During peer interaction, participants usually use the reasoning of one another as cognitive scaffold and become exposed to new patterns of thought in a social process that requires cooperative, collaborative, consensual and non-authoritarian exchange of ideas. This requirement for the maintenance of interaction, talk, and communication in the process has made the study of peer status even more relevant.

Peers are adolescents who are of about the same age or maturity level. During adolescence, there is a redefinition of some basic social relationships which compared with childhood may be much more important and intimate. Peer relations refer to many types of process or experience that defines one’s social status or social standing in the group (Asher & Coie, 1990). Consequently, different classification of peer status has been proposed among aspects of children’s experiences with their peers (Asher & Coie, 1990; Newcomb, Bukowski, & Pattee, 1993). Adolescents with popular peer status are frequently nominated as a best friend and a liked-friend by their peers. They therefore have the experience of being liked or accepted by the members of their peer group. Those with rejected peer status are not frequently nominated as a best friend or a liked-friend by their peers. They therefore have the experience of being actively disliked by their peer group. Finally, adolescents with neglected peer status are not frequently nominated as a best friend but are frequently nominated as a

liked-friend by their peers. They therefore have the experience of being neither liked nor disliked but rather ignored by their peer group.

Studies that have been conducted to assess the behaviour correlates of different peer status have shown evidence that popular adolescents are skilled at initiating and maintaining interaction with their peers, enter groups easily, communicate clearly with their peers, elicit their peers' attention, give out reinforcement, listen carefully and are friendly. They are also self-confident without being conceited (Newcomb, et al, 1993). Even when they lack prosocial qualities, popular children are still able to hold good-quality friendships because of other compensating characteristics, such as popularity by association (Poorthuis, Thomaes, Denissen, van Aken, & Orobio de Castro, 2012). The rejected adolescents are found to be aggressive; exhibit antisocial behaviours that are disruptive of group activities that are not appropriate to the situation at hand (Dishion & Spracklen, 1996) and they find it difficult to maintain open lines of communication with their peers and to enter groups and make friends. Research has also shown that adolescents with neglected peer status are less aggressive than shy and are less socially active and less talkative and also seldom enter groups and make friends (Coie & Kupersmidt, 1983). While the determinants of the different peer status may vary across culture (Dong, Weisfeld, & Shen, 1996), the behavioural correlates are to a large extent similar across cultures.

Most of the studies on peer status have tried to examine how peer relations contribute to normal social development and cognitive achievement in adolescence. To this end, several findings have shown that good peer relationships were associated with positive social adjustment and positive mental health, but poor peer relations are associated with delinquency, problem drinking, depression and smoking (Prinstein & Aikins, 2004; Ylva, Almquist, & Ostberg, 2013) and that disruptive peer behavior negatively affects individual cognitive achievement (see Neidell & Waldfogel 2010; Carrell & Hoekstra 2010). Very few studies have however tried to examine peer group effects on tests of cognitive ability especially critical thinking even though evidence has shown that peer groups influence tests of cognitive ability (Zimmerman, 2003). Since rapid cognitive changes have been found to be associated with adolescence (for example, formal operational thought is characteristic of adolescent period (Piaget, 1970); Information processing speed continues to increase rapidly in early adolescence (Hale, 1990); Particularly there is an increase in automaticity and ability to construct new combination of knowledge, widened knowledge content across domains, and greater range and more spontaneous use of strategies for cognitive activities (Keating, 1990). The social process of knowledge construction will then be a unique determinant of the development of critical thinking in adolescents. Drawing from the behavioural correlates of peer status, adolescents with rejected and neglected peer status may have problem benefiting fully from peer group interactions because they relatively lack the necessary skills for proper communication. They also socially isolate themselves and the rejected finds it difficult to be members of peer group without being disruptive of group processes. It is therefore hypothesized that scores on general critical thinking test will vary across peer status with adolescents who have popular status having higher scores. Positive correlation between measures of general intelligence (or cognitive ability) and critical thinking have been reported. For example, both traditional measures of cognitive ability and critical thinking skills are positively correlated and negatively associated with superstitious and paranormal beliefs (Kuncel, 2011). Glaser (1942) also reported a positive correlation between measures of

general intelligence and critical thinking gains after instruction. This correlation suggests that both measures behave similarly and that one may even contribute to or be a developmental outcome of another (Kuncel, 2011). In this study therefore, general intelligence was considered as a covariate.

Method

Participants

Participants were 615 (299 males and 316 females) Senior Secondary II (SSII) students. Three hundred and fifty two (352) of the participants (195 males and 157 females) were drawn from two Secondary Schools in Enugu state while 263 (112 males and 151 females) were drawn from two Secondary Schools in Akwa Ibom state, Nigeria. Their ages ranged from 15 to 21 years ($\bar{X} = 17.56$; $SD = 2.19$). The participants comprised the entire population of SSII students in the four schools. The population was used since peers will be categorized into different peer status using the ratings from their classmates. The participants speak Igbo and Ibibio languages.

Measures

Peer assessment measure

The rating and nomination sociometric technique (Asher & Hymel, 1981; Asher & Dodge, 1986) was used to assess adolescent's peer status. Sociometric techniques or peer-based evaluation techniques include the nomination technique in which the child is asked to name some specific number of well- liked or disliked peers and also the paired- comparison technique in which the child is presented with the names of two classmates at a time and asked to pick the one that he or she likes better. A distinction has been drawn between positive nominations and rating scales. Whereas positive nominations measure friendship (how many peers regard a child as a best friend or high- priority playmate), rating scales measure "a child's overall level of acceptability or likeability among peers" (Asher & Hymel, 1981). In this study both rating and nomination peer assessments were used to define social status as posited by Asher and Dodge (1986). Thus for the rating technique, a 5-point Likert-type scale ranging from Not at all (1point) to All the time (5points) was used to measure the extent to which each participant liked to work and play with each classmate.

Based on the ratings and the standardized numbers of nominations, participants' peer status were determined as follows: The number of nominations for the question "who do you like to play with or work with best of all?" were tallied and standardized (z- scores) within class for each child to represent the like most (LM) score. The lowest rating of 1 (not at all) on the rating scale received by each participant was tallied and standardized (z- scores) to represent the like least (LL) score. The LM and LL scores were then used to determine each participant's social status as used by Coie, Dodge, and Coppotelli (1982). Social Preference (SP) was determined by subtracting LL from LM (i.e. $LM - LL$) and Social Impact (SI) was determined by adding LL and LM (i.e. $LL + LM$).

Using the LL, LM, SP and SI scores participants' social status were determined as follows:

1. Participants with popular peer status were those that receive SP score of greater than or equal to 1.0, LM standardized score of greater than 0, and LL standardized score of less than 0.
2. Participants with rejected peer status were those that receive SP score of less than or equal to -1.0, LM standardized score of less than 0, and LL standardized score of greater than 0.
3. Participants with neglected peer status were those that receive SI score of less than or equal to - 1.0 and absolute LM score of 0.

Thus, participants with neglected peer status had no one identifying them as among the three people they will like to play with or work with best of all. They differed from those with rejected peer status in that the rejected received many nominations as liked- least whereas the neglected did not.

The assumption underlying this technique is that the adolescent's peers should be the best judges of that adolescent's standing among peers. Sociometric techniques are valid in determining an adolescent's peer status since it focuses directly on what the peer group thinks of the adolescent. Positive correlations have been reported between peer ratings and teachers' ratings (Green, Forehand, Beck, & Vosk, 1980) and between sociometric scores with direct observation of children's social interactions (Bukowski & Hoza, 1989).

Critical thinking measure

The Test of Critical Thinking, Form G (TCT-G) (The American Council on Education, 1954), was used to measure critical thinking. It consists of fifty-two objective-type questions in five sub-tests that test the ability to define Problems, ability to select pertinent information, ability to recognize unstated assumptions, ability to invent and evaluate hypotheses, and ability to make valid inferences and to judge the validity of inferences, with the questions of the first, second, and fifth sub-tests intermixed (Bass, 1959). A split-half coefficient of reliability, using a sample of college freshmen (N = 97), was reported to be .84. Coefficients of validity for this test were reported to be from .65 to .85, with an approximate mean of .73, based on sub-test inter-correlations of data from several colleges (Dressel & Mayhew, 1954). KR - 20 of 0.89 was obtained using a sample of senior secondary school II students in Nigeria (N = 60) (Ezeh, 2011). Correct answer is given a score of two.

Measure of general intelligence

EGIT 4 developed by Eysenck (1981) was used to measure general intelligence. It is a 40-item objective type instrument that assesses components of intelligence like verbal, quantitative and spatial aptitude as well as logical reasoning, making inferences, creativity and problem solving. Using equivalent test, Ihekuna (1991) obtained a test-retest reliability coefficient of .66 for EGIT 4 and correlating EGIT 4 equivalent test with Cattell and Cattell's (1960) Culture Fair Test Scale 2, Ihekuna (1991) obtained a concurrent validity of .46 using Nigerian samples and mean scores of 12.88 for males and 10.52 for females. The

modification of EGIT-4 for Nigerian samples enhanced its face and content validity. A correctly shaded option in each question is awarded 1 point.

Procedure

Peer assessment was confined to student's classmates. This was based on the assumption that there will be few opportunities to socialize with students from other classes. Since participants rated how much they liked to play or work with classmates, the experimenter discussed with the students on the need and reasons for absolute confidentiality before and after the experiment. With the help of research assistants, students were trained on the 5- point likert- type scale. To make sure they understood, they were asked to rate different foods. After training, participants' classmates' names and identification numbers were presented to each participant in form of a class roster. Located to the right of each name on the roster was a 5- point scale ranging from 1= not at all to 5= all the time. Participants were told to rate how much they liked to work and play with each classmate by circling a number from 1 to 5 on the 5- point scale.

For the nomination technique, participants were given a sheet of paper each and were asked to nominate three classmates for the question: "who do you like to play with or work with best of all?" by writing the identification numbers corresponding to the classmates' names on the roster. Based on the ratings and the standardized numbers of nominations, participants were categorized into those with popular, rejected and neglected peer status. Participants were then administered the Eysenck General Intelligence Test 4 (EGIT 4) and were instructed to read the questions and respond by shading the correct option in the answer sheet. Finally, the TCT-G was administered to the participants. They were instructed to read the directions for groups of items carefully before providing answers to items. They were also told not to worry about unfamiliar words as that will not prevent them from answering the items. They were given 50 minutes to respond to the TCT-G items. At the end of this exercise, participants were debriefed and were rewarded with biscuits and pencils.

Results

In this study, a one-way analysis of covariance (ANCOVA) was used. The independent variable was peer status (popular, rejected and neglected). The dependent variable was scores on critical thinking test and the covariate was scores on EGIT 4 (measure of general intelligence). A preliminary analysis was conducted to evaluate the homogeneity of regression (slopes) assumption and it was found that the interaction between the covariate and the independent variable in the prediction of the dependent variable was not significant [$F(2,609) = 1.66, p > .05$].

The ANCOVA result revealed a significant difference in critical thinking scores among peer status conditions [$F(2,611) = 27.57, p < .001$]. The three levels of peer status accounted for 8% ($\omega^2 = .08$) of the total variance in critical thinking scores controlling for the effect of participants general intelligence.

Table 1: Summary ANCOVA results for the effect of adolescent peer status on critical thinking.

SOV	SS	Df	MS	F	Sig.
EGIT 4	71.68	1	71.68	7.97	.01
Peer Status (PS)	496.21	2	248.11	27.57	.000
ERROR	5497.68	611	8.99		
TOTAL	115168.00	615			
Corrected Total	6101.17	614			

Follow-up test was conducted to evaluate pairwise differences among the adjusted means for peer status. The Bonferroni procedure was used to control for type 1 error across the three pairwise comparisons. The results showed that adolescents with popular peer status ($\bar{X} = 14.36$) had significantly higher critical thinking scores, controlling for the effect of their general intelligence, than those with rejected peer status ($\bar{X} = 12.22$, ES = .71) and those with neglected peer status ($\bar{X} = 13.04$, ES = .44) (See Table 2).

Table 2: Pairwise comparisons and effect sizes (ES) of critical thinking scores and adolescent peer status.

$(\bar{X} - \bar{X})$			Adjusted	Mean	Differences
Conditions	Mean	Adjusted Mean	1	2	3
1. Popular status	14.40	14.36	-		
2. Rejected status	12.21	12.22	2.14** (ES = .71)	-	
3. Neglected status	12.99	13.04	1.32* (ES = .44)	.81* (ES = .27)	-

Note: ** $p < .001$, * $p < .05$, ES = effect size

Discussion

This study examined the effects of adolescent peer status on critical thinking. Findings revealed a significant influence of peer status on critical thinking. Participants with popular status were found to score higher in critical thinking test followed by those with neglected status thus supporting our hypothesis. To the best of the researcher's knowledge no study has been conducted to assess peer status effect and scores on critical thinking test even though a familiar proposition is that student achievements become superior in the presence of peer groups. General critical thinking can develop in both formal and informal setting and that is why when peers interact whether in formal or informal setting; so long as there is mutual communication, there can be considerable cognitive gains. That is perhaps why the use of collaborative (cooperative) approach to instruction on the development of critical thinking skills has been suggested by many researchers (e.g., Bailin, Case, Coombs, & Daniels, 1999; Thayer-Bacon, 2000) who recommended that critical thinking instruction at early schooling should include teaching students to respond constructively to others during

group discussion in pro-social ways by encouraging and respecting the contributions of others, be willing to see things from another's perspective (Bailin, Case, Coombs, & Daniels, 1999) and to understand the views of others (Facione, 1990). This is because even if there is appropriate instruction, it is through collaborations that students have the opportunities to correct disagreements and misconceptions (Nelson, 1994) to break down egocentrism and encourage more mature and scientific forms of thought (Musatti, 1986). In fact, participation in even clubs and organizations has been reported to predict increase in critical thinking test scores (Gellin, 2003).

When peers interact there can be conflicts of ideas which forms alternatives to the child's own point of view and may prompt the child toward higher level solutions by incorporating the partial insights reflected in their varying initial positions (Piaget, 1932). Popular adolescents tend to score higher on critical thinking test because of their behavioural disposition. Rejected and neglected adolescents on the other hand do not enjoy positive, supportive relationships with their peers and adults (Goodenow, 1993). Adolescents with rejected status are disruptive of group functioning; are actively disliked by their peers and do not outgrow them automatically (Dodge, 1993). That means, over time, rejected adolescents tend to know that they are actively disliked leading to the development of certain abnormal behaviours and probable interference with the development of critical thinking. But for adolescents with neglected peer status, studies have shown that when they are compared with average- status students, neglected adolescents tend to be more prosocial and compliant, better liked by their teachers, are self- regulated learners and have positive academic profile (Wentzel & Asher, 1995). The compliant nature of neglected adolescents is actually a compensating attribute because peers would prefer to work with them rather than rejected ones. They also have significant others such as teachers to interact with and can also self-regulate their learning because they don't have any feeling of rejection. This may explain their better performance in critical thinking test than those of rejected status.

This finding notwithstanding, rejection and neglect are problems since they interfere with the individual's ability to develop and use critical thinking skills. Knowing the importance of critical thinking to the survival of mankind, it is necessary that early rejection be identified and treated so that such individuals can benefit fully from the cognitive gains of social interaction. The same is for the neglected. Even though they tended to score high in critical thinking than the rejected, if there is an intervention early enough so that they are less shy and enter groups easily they may even score higher in critical thinking. Teaching in classrooms, especially in developing countries like Nigeria, should be deliberately constructed in such a way that the ability to think critically is activated in adolescents at every stage of learning. Teachers should foster the ability to be reflective in students by asking questions that cue adolescents into being aware of their memory abilities and knowledge of task demands so as to stimulate thinking essential to the construction of knowledge. This study has some limitations. In the process of categorizing participants into the different peer status, it was discovered that some of the participants did not fall into any of the categories because their standardized rating and nomination scores did not fall within the definitions of these status and were therefore not included in the study. Further studies should find a more holistic way of categorization. It is also likely that adolescents' implicit attitudes toward learning and personality traits may act as moderators between adolescents peer status and critical thinking test scores.

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