

Adolescents with Hearing Impairment: Coping with Environmental Stressors

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Abstract: Aims - To assess the effect of two different environmental stressors, impending tests and the threat of terror bombing attacks, on adolescents with and without hearing impairment and to compare coping strategies and psychological reactions to the stressors between the two groups. Method - Eleven adolescents with hearing impairment and 65 hearing adolescents, aged 13-15, learning at an inclusive school completed the demographic Coping Across Situation Questionnaire, the Test Anxiety Inventory, and a terror-bombing-related stress symptoms questionnaire.

Results - Higher levels of test stress and terror-related stress symptoms were found in the adolescents with hearing impairment. They used more avoidant coping and less active coping than the hearing adolescents. Higher use of avoidant coping was related to higher levels of test and terror-related symptoms, internal coping was related to higher test stress only, and active coping was related to lower terror-related symptoms.

Conclusions - Identifying and targeting the factors related to developing avoidant coping styles by adolescents with hearing impairment could help them to adopt more efficient coping strategies. Programs should be initiated to teach the adolescents coping strategies, such as problem solving and sharing concerns with significant others, as well as stress management skills.

Key Words: hearing impairment, coping strategies, environmental stressors

Introduction

Research on children and adolescents with hearing impairment has tended to focus on cognitive factors, such as language acquisition, communication skills, or academic development (e.g., Luckner & Muir, 2001), or developmental factors, such as self-esteem (Jambor & Elliot, 2005), self-identity (Kent, 2003), or adjustment to the hearing society (Polat, 2003). Much less is evident in the research literature on the ways children with hearing impairment cope with environmental or developmental stressors experienced alike by all children of similar age groups. Yet, to understand developmental issues of children and adolescents with hearing impairment, this must be assessed in relation to the nature of their interaction with their environment and the nature of the stressors emanating from their environment (Garbarino & Abramowitz, 1992).

Two kinds of persistent stressors were assessed in the present study. One is test stress, often referred to as test anxiety (Folkman & Lazarus, 1985; Zeidner, 1994, 1996), ever-present in students during their years of schooling and higher education. The other is stress generated by the threat of terrorist attacks, continuous in Israel for decades but recently coming to be shared by other countries. Both are major environmental stressors, but consist of different elements.

Literature Review

Test Stress

Test stress is transient in nature, but it tends to recur before each examination period. It consists of elements such as preparation for the impending threat, confrontation with the stressor, uncertainty about the outcome, and coping with its consequences (Folkman & Lazarus, 1985; Zeidner, 1994, 1996). Past studies found that tests constitute a stressful situation that initiates anxiety (Carver & Scheier, 1994; Folkman & Lazarus, 1985; Zeidner, 1996). Test stress is an emotional state, characterized by feelings of worry and autonomic system arousal (high pulse rate, sweating, stomachaches, irritability) (Spielberger, Gonzales, Taylor, Anton, Algaze, & Ross, 1980). A high level of stress proved to be associated with poorer performance and poorer achievement in the tests (e.g., Cassady & Johnson, 2002; Dutke & Stober, 2001). Also higher levels of test anxiety were related to perceptions of the self, such as lower sense of self-efficacy (McIlroy, Bunting & Adamson, 2000) or lower self-esteem (Sarason & Sarason, 1990) and the use of avoidant coping (Aysan, Thompson & Hamarat, 2001; Zeidner, 1994). Test stress, as far as it is known, has not so far been assessed in adolescents with hearing impairment. However, it can be hypothesized that adolescents with hearing impairment may experience lower sense of self-efficacy or self-confidence (Dessele, 1994), factors which may increase their test stress.

Stress of Terrorist Attacks

In contrast to the transient nature of test stress, the stress stemming from the threat of terrorist attacks is never-ending. Children and adolescents in Israel live with a constant feeling of vulnerability, namely that they or their family members could be the victims of a terror attack. They are exposed time and again, through media broadcasts and through acquaintances, to the horror of these atrocities. Several studies have demonstrated that indirect exposure to a violent attack, through knowing a person involved or through seeing it on TV may stimulate the same reaction as direct exposure to the attack, due to the intensive coverage of suffering and personal vulnerability (Pfefferbaum et al., 2001; Pynoos et al., 1987; Singer, Slovak, Frierson & York, 1998). This exposure shatters the assumption of being safe that most individuals nurture to retain (Baum & Dougall, 2002). This situation has negative effects similar to that of living in dangerous neighborhoods (Jenkins & Bell, 1997; Pynoos & Nader, 1990).

The effect of continuous exposure to constant traumatic events may produce in children stress symptoms or even posttraumatic stress disorder (PTSD), including re-experiencing intrusive thoughts, avoidance, and arousal and somatic complaints such as headaches, stomachaches, fatigue, attention difficulties, or behavior problems (Barenbaum, Ruchkin & Schwab-Stone, 2004). Enduring psychological distress or PTSD can be caused in adolescents by even indirect exposure to a single violent event, such as the Oklahoma City bombing (Pfefferbaum et al., 2001) or a sniper attack on a school playground (Pynoos et al., 1987). After the World Trade Center disaster a survey of a representative sample of parents throughout the US found that 35% of children had one stress symptom or more (Schuster et al., 2001).

Coping Strategies

The psychological reaction to environmental stressors varies among individuals. A major factor consistently found to affect the psychological reaction is the coping strategies used. Folkman and Lazarus (1985) conceptualized coping with stressful events as the cognitive and behavioral efforts initiated by an individual to manage external or internal demands that are appraised as threatening or exceeding his or her resources. This is a transactional model, in which the coping strategies used by an individual derive from personal characteristics and resources, as well as the characteristics of the environment and of the specific stressful event, and from a cognitive appraisal of the situation (Folkman & Lazarus, 1985). Based on empirical results, Seiffge-Krenke (1993) suggests three dimensions of adolescent coping: active-external coping, by means of social resources; internal coping, which focuses on thinking about and looking for solutions, and avoidant coping, which consists of denial, repression, or fatalistic attitudes (Seiffge-Krenke, 1993).

Much research centers on adolescents' coping with major life events and everyday hassles (reviewed in Compas, Connor-Smith, Saltzman, Thomsen & Wadsworth, 2001) and on how adolescents and children with hearing impairment manage the difficulties of the hearing impairment itself (Jambor & Elliott, 2005). No literature is available on adolescents' with hearing impairment coping strategies for environmental stressors. Based on Folkman and Lazarus' (1985) coping theory, it may be assumed that due to higher everyday stressors encountered by adolescents with hearing impairment (such as communication problems, strain in interactions with hearing adolescents) (Desselle, 1994; Polat, 2003; Powers, 2003; Rachford & Furth, 1986) and the complexity of handling the developmental tasks of adolescence (Hillburn, Marini & Slate, 1997; Jambor & Elliot, 2005; Kent, 2003), adolescents with hearing impairment may experience lower personal resources and a lower sense of competence in managing environmental stressors. However, according to resilience theory, the reality of coping with the unique challenges of hearing impairment may equip these adolescents with more efficient skills to tackle additional environmental stressors (Masten & Coatsworth, 1998). At present we lack empirical knowledge of these issues. Gaining understanding of the ways adolescents with hearing impairment cope with environmental stressors may help in devising intervention plans to impart to them efficient coping strategies. Knowledge of this understudied issue may also qualify teachers, social workers and parents to promote efficient coping in the face of environmental stressors.

Deaf Society in Israel

Deaf society in Israel consists of approximately 10,000 people. Most communicate bilingually, using oral communication and sign language. Deaf people with lower education or older people tend to rely more on sign language. The deaf community in Israel has a strong deaf culture and many organized activities. Many of the more educated deaf are not part of it and their social connections are within the hearing community or in separate small peer groups. Most adolescents with hearing impairment study in the inclusive elementary and high school system. The integration of students with hearing impairment in schools is based on their abilities and their needs. Most of them learn in separate classes, using sign and oral language. They participate in social activities and join the hearing children for some classes (e.g., arts, gymnastics). Some of the adolescents with hearing impairment are integrated wholly or partially into regular classes, with special aids according to their needs.

This study sets out to extend our knowledge of how adolescents with hearing impairment cope with test anxiety, which is a transient stress, and the threat of terror bombings, which is an ongoing and life-threatening stressor. Their coping strategies and their psychological reactions are compared with those of their hearing fellows.

Method

Participants

Participants were 11 adolescents with hearing impairment and 65 hearing adolescents, aged 12-13, at an inclusive high school in Israel. The hearing impairment was either deafness or severe hearing loss. Adolescents communicated using sign and oral language. They studied in separate classes but took several other classes with the hearing adolescents. Both groups studied on the same academic level toward full accomplishment of matriculation. No statistically significant differences emerged in the two groups' demographic characteristics, presented in Table 1, which indicated a good match for further comparisons. The groups were also similar in their exposure to terror events. None of them or their family members and friends had been injured in a terror attack. Of the hearing adolescents, 21.5% (N = 14) 27.3% (N = 3) of the adolescents with hearing impairment knew someone who had been involved in a terror attack and 81.8% (N = 9) and 93.8% (N = 61) respectively watched TV broadcasts at times of a terror event. Differences were not statistically significant.

Table 1: Demographic characteristics of hearing impaired and hearing adolescents

		Hearing impaired adolescents		Hearing adolescents	
		N	%	N	%
Gender	Male	4	36.4	31	47.7
	Female	7	63.6	34	42.3
Grade	7 th (13-14)	6	54.5	32	49.2
	8 th (14-15)	5	45.4	33	50.8
Father's employment	Employed	9	81.8	60	90.9
	Not employed	2	18.2	5	8.1
Mother's employment	Employed	9	81.8	57	88.1
	Not employed	2	18.2	8	11.9

Age (M + SD)

13.8(0.9)

13.2(0.6)

Procedure

The adolescents were approached in class. The study's background and aims were explained, after which the students were asked to complete the questionnaires. None of the students refused to participate. Agreement from parents and the Ministry of Education was obtained before the beginning of the study. All students filled paper-and-pencil questionnaires, with no need for modification or sign interpretation for the adolescents with hearing impairment. The study was conducted as the year-end school exams approached; it was also a time of frequent mass terror atrocities in Israel.

Questionnaires

Demographic data were obtained through a questionnaire constructed for the purpose of this study, including information on age, parents' employment and parents' familial status.

Terror-Related Stress

Terror-related stress symptoms were assessed by a seven-item scale questionnaire, based on the five-item version adopted by Schuster et al. (2001) from the PTSD scale of the Diagnostic Interview Schedule for Children, Version IV (Shaffer, Fisher, Lucas, Duclan & Schwab-Stone, 2000). Such use of shortened PTSD screening tools was previously reported (e.g., a four-item PEDS' PTSD scale: Saylor, Cowart, Jackson, & Finch, 2003). The measure represents the three symptoms of PTSD, probing their intensity in the previous month: intrusion ("Have you been having nightmares?"), avoidance ("Have you been avoiding thinking, talking or hearing about terror attacks?"), and arousal ("Have you been feeling irritable or lost your temper?" "Do you have trouble falling asleep?" "Do you have trouble keeping your mind on things and concentrating?"). Two items on somatic symptoms (headaches and stomachaches) were added. Intensity of symptoms in the previous week was rated on a scale from 0 (none) to 5 (extreme). A global stress-reaction symptoms score was calculated, ranging from 0 to 35. The following categorization of scores was used: 0-8 = none to low; 9-17 = mild; 18-26 = moderate; 27-35 = severe. Internal consistency (Cronbach's alpha) of the questionnaire was .88.

Test Anxiety Inventory (Spielberger et al., 1980)

The 20-item Hebrew version was used to assess test stress (Zeidner, 1994, 1996). The scale includes two dimensions: worry, which consists of the cognitive aspects of the stress experience (e.g., "I have constant thoughts about failing the test"), and emotionality, which refers to arousal and its consequent physiological sensations (e.g., "I have stomachaches during exams"). Answers ranged from 1 = never to 4 = most of the time. Cronbach's alpha for the internal consistency of the total questionnaire was .91, for the worry subscale .87, and for emotionality, .77.

Coping Across Situations Questionnaire (Seiffge-Krenke, 1993; Shulman, Seiffge-Krenke & Samet, 1987)

The 20-item Hebrew version was used. The scale consists of three dimensions: active coping (e.g., "I discuss the problem with my friends"), internal coping (e.g., "I think about the problem and try to find solutions"), and avoidant coping (e.g., "I try not to think about the problem"). The three dimensions were confirmed in the present study by factor analysis. Answers ranged from 1 = almost never to 4 = most of the time. Cronbach's alpha for the internal consistency for the total questionnaire was .89 and for the sub-scales .86, .79, and .84 respectively.

Statistical Analysis

Descriptive statistics and frequencies were calculated. *t*-tests for continuous variables and χ^2 test for dichotomous variables were used to assess differences between the adolescents with hearing impairment and hearing adolescents. A hierarchical multiple regression analysis was performed to assess the contribution of gender, group, and coping variables to predicting test stress and terror-related stress symptoms. A Skewness test was used to assess the normality of distribution, and in spite of the small sample, a normal distribution of the variables was affirmed.

Results

Test and Terror-Related Stress and Coping Strategies

Table 2 presents mean scores (\pm sd) and *t*-test results of the study variables. The adolescents with hearing impairment reported experiencing significantly higher levels of test stress than hearing adolescents. These differences were evident in both dimensions of the test stress: emotionality and worry. Adolescents with hearing impairment also reported significantly higher terror-related symptoms. Again, significant differences were observed on each of the stress symptom dimensions, namely intrusion, avoidance, arousal, and somatic symptoms.

Table 2: Mean (S.D.) of test stress, terror-related stress, and coping in hearing impaired and hearing adolescents

	Hearing impaired adolescents		Hearing adolescents		<i>t</i> (74)
	M	SD	M	SD	
Test stress (total)	2.53	1.09	1.67	0.88	-2.63*
Emotionality	2.00	1.00	1.21	0.57	-3.74***
Worry	2.70	0.93	1.56	0.98	-2.40*
Terror-related stress symptoms (total)	2.48	0.77	1.53	0.51	-5.29***
Intrusion	2.91	0.83	1.96	0.94	-3.15**
Avoidance	2.50	1.23	1.42	0.75	-3.80***

Arousal	2.0	1.34	1.17	0.46	-3.85***
Somatic symptoms	2.14	1.07	1.49	0.79	-2.08*
Active coping	2.04	0.63	2.95	0.57	-2.65*
Internal coping	3.15	0.79	2.88	1.19	1.17
Avoidant coping	2.86	1.00	2.32	0.87	2.43*

*p<.05, **p<.01, ***p<.001

Regarding coping strategies, hearing adolescents used significantly more active coping strategies, while adolescents with hearing impairment used more avoidant coping strategies. Higher use of internal coping strategies by the adolescents with hearing impairment was evident, but this difference did not reach statistical significance.

Relationship Between Test Stress and Terror-Related Stress and Coping Strategies

Table 3 displays the results of the regression analyses. Test stress was predicted by group, gender, and internal and avoidant coping strategies. Namely, having a hearing impairment, being a female, and using more internal and avoidant coping were significantly related to higher test stress. Active coping was not significantly related to test stress. Terror-related symptoms were predicted by gender, group, active coping and avoidant coping. Being a female, having a hearing impairment, more use of avoidant coping, and less use of active coping were related to higher level of terror-related symptoms. Internal coping was not significantly related to stress symptoms. The dependant variables accounted for a higher percentage of the variability of terror-related stress symptoms than for that of test stress symptoms.

Table 3: Hierarchical regression analyses predicting test stress and terror-related stress symptoms

Variable	Test stress			Terror-related stress symptoms		
	beta	t	p	beta	t	p
Gender	-.16	2.16	.04	.26	2.41	.02
Group	.24	2.10	.04	.31	3.12	.003
Active coping	-.07	-.64	.52	-.22	-2.31	.03
Internal coping	.28	2.44	.01	.13	1.09	.28
Avoidant coping	.29	2.58	.01	.31	2.94	.005
Total R ²	.30			0.42		
Adjusted R ²	.23			0.36		

Discussion

The present study assessed the psychological reaction of adolescents with hearing impairment and hearing adolescents in Israel to two environmental stressors, school tests and the threat of terror-bombing attacks. Higher levels of test stress and terror-related stress symptoms were found in the adolescents with hearing impairment; they used more avoidant coping and less active coping than the hearing adolescents. While more use of avoidant coping was related to

both higher level of both test stress and terror-related symptoms, internal coping was related to higher test stress only, and active coping was related to lower terror-related symptoms.

Psychological Reaction to Tests and to the Threat of Terror Stressors

This is apparently the first study to examine the way adolescents with hearing impairment cope and react to both tests and to the threat of terror-attacks stressors. The adolescents with hearing impairment reacted with higher level of cognitive, physical, and emotional symptoms to the environmental stressors than did the hearing adolescents. These results can be explained by Folkman and Lazarus' coping model (1985), according to which stress reaction appears when environmental demands exceed the individual's resources. In the case of adolescents with hearing impairment, environmental stressors pile up on top of everyday hassles and demands that adolescents with no hearing impairment are spared; examples are communication problems, difficulties in academic achievement, and problems in interactions with hearing society and peers (Desselle, 1994; Polat, 2003; Powers, 2003; Rachford & Furth, 1986). Moreover, in adolescents with hearing impairment the normative crises and tasks of adolescence, such as building a sense of identity, independence and self-esteem, are more complicated and require more personal energy and resources (Hillburn, Marini & Slate, 1997; Jambor & Elliot, 2005; Kent, 2003), a situation which may diminish the personal resources available for dealing with other stressful situations. Appraisal of the stressor and of personal resources to cope with it is another central element in the transactional model. Children with hearing impairment often have less information about their environment (Georgy, 1998), including the stressors they encounter, and may ask for information less. The notion that they appraise their environment differently has empirical support also (Murdock & Lybarger, 1997; Rachford & Furth, 1986).

Coping Strategies Used by Hearing Impaired and Hearing Adolescents

Coping strategies are a major element in the transactional model (Folkman & Lazarus, 1985). The types of coping strategies used by the individual exert a major effect on the psychological reactions to stressors. According to Seiffge-Krenke (1993), active coping combines aspects of problem-focused coping by means of social resources. Numerous previous studies found that active and problem-focused coping or seeking social support (Folkman & Lazarus, 1985; Seiffge-Krenke, 1993; Seiffge-Krenke & Stemmler, 2003) were related to better adjustment to major life events. This active coping was less used by the adolescents with hearing impairment, possibly due to their difficulties in communication, or their being less confident in their ability to ask for help or advice (Georgy, 1998; Rachford & Furth, 1986). Active coping strategies necessitate communication and social skills; several studies have suggested that children with hearing impairment possess these in a lesser degree (Martin & Bat-Chava, 2003). This problem is exacerbated for children with hearing impairment in hearing families, in which communication difficulties exist inside the family circle too (Hindley, 1997). The literature argues that effective communication with parents is highly important for psychosocial development and acquiring social skills (Desselle & Pearlmutter, 1997; Hillburn et al., 1997). Also, avoidant coping, which was used more by adolescents with hearing impairment in this study, was previously found related to worse adjustment and higher psychological distress in stressful situations (Folkman & Lazarus, 1985; Seiffge-Krenke, 1993; Seiffge-Krenke & Stemmler, 2003).

Relationship of Coping Strategies and Type of Environmental Stressor

Interesting facets emerged regarding the relationship between coping strategies and the stressors examined. Higher test stress was associated with more avoidant and internal coping, but not with active coping. This finding resembles findings of previous studies that assessed the association between test stress and coping strategies according to the coping models of Carver and Scheier (1994; Zeidner, 1996) or Folkman and Lazarus (1985). On the other hand, active coping was strongly related to lower terror-related symptoms, presumably due to the relief that could be found in sharing and in disclosure of emotions to others. Avoidance already proved related to worse outcomes of exposure to trauma (Bryant, Harvey, Guthrie, & Moulds, 2000). The lack of association between internal coping and stress symptoms could be due to the characteristics of the threat of terror attacks, which might be less able to be mastered by thinking, analyzing, or looking for solutions.

Gender Differences in Levels of Psychological Reaction to Stressors

In keeping with previous studies, girls in this study experienced higher levels of test stress and terror-related symptoms (e.g., Aysan et al., 2001; Allen, 1998). However, other studies did not support the relationship between gender and psychological distress in adolescents coping with highly stressful situations (reviewed in De Jong, 2002).

Limitations

Some limitations of the study should be acknowledged. Foremost is the small number of adolescents with hearing impairment. This is particularly significant as levels of stress and coping strategies varied within the group of the adolescents with hearing impairment, as seen from the standard deviation figures. This calls for caution in interpreting the results. In addition, the small number of adolescents in this group made it impossible to assess mediating or moderating factors. Identifying these mediating/moderating factors would help in the development of intervention programs to strengthen the adolescents' coping resources.

Yet another limitation is that the participants were all from the same school. This limits the study results' generalizability to other adolescents with hearing impairment. However, the importance of the present study lies in its primary description of the reactions to and coping with environmental stressors by adolescents with hearing impairment. Further studies are needed to gain better understanding. For example, we should improve our grasp of gender differences in stress reactions and coping in children and adolescents with hearing impairment. Also, longitudinal studies should be conducted to understand the development and change with time in reactions to stressors. Above all, we must learn how we can help adolescents with hearing impairment in developing resilience against life's stressors.

Recommendations

The main conclusion from the present study is that programs should be initiated and evaluated by means of research to teach adolescents with hearing impairment coping strategies,

such as problem solving and sharing concerns and anxieties with significant others (Pincus & Friedman, 2004). Additional approaches should concentrate on teaching stress-management skills that address the emotional, cognitive, and physiological aspects of stress. Examples are teaching cognitive techniques of eliciting dysfunctional thoughts and reframing them (Graham, 1998) and teaching relaxation and guided imagery (Smith & Womack, 1987). Interventions should be applied to the more severe effects of the constant threat of terror onslaughts on adolescents with hearing impairment and to implement interventions to improve coping with this situation.

Stress reactions to the threat of terror are augmented by lack of sense of control (Gidron, Kaplan, Velt & Shalem, 2004). This may be mitigated in adolescents with hearing impairment through a central system of information transfer using modern technology such as internet, cellular phones or pagers. For example, during the second Lebanon war pagers were distributed to deaf individuals that gave a warning and information about alerts. Other innovative solutions should be devised.

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