Irrational beliefs and stress levels: Evidence among orphaned students in Kenyan secondary schools

Millicent Awino Umija (iD)
Department of Educational Psychology, School of Education, Jaramogi Oginga Odinga University of Science and Technology, Bondo, Kenya

Peter J.O. Aloka (iD)
Division of Studies in Education, Wits School of Education, University of Witwatersrand, Johannesburg, South Africa
jairopeteraloka@yahoo.com

Washington O. Wachianga (iD)
Department of Special Needs Education, School of Education, Jaramogi Oginga Odinga University of Science and Technology, Bondo, Kenya

In the study reported on here we examined the relationship between irrational beliefs and stress levels among orphans in public secondary schools in Kenya. Rational Emotive Behaviour Theory was adopted. In the study we adopted a cross-sectional correlation research design. A sample size of 350 double orphaned students in secondary schools was obtained using stratified and simple random sampling techniques. The Irrational Belief Inventory and Perceived Stress Scale were used to collect data. The reliability results indicate the Cronbach's alpha values ranging from 0.672 to 0.756. Quantitative data from questionnaires were analysed using inferential statistics such as Pearson correlation and regression analysis. The findings established a weak positive ($n = 314$, $r = .149$; $p = .008 < .05$) Pearson product-moment correlation coefficient between demandingness and stress levels; a weak positive ($n = 314$, $r = .243$; $p < .05$) correlation between awfulizing and stress levels; a weak positive ($n = 314$, $r = .191$; $p < .05$) correlation between irrational belief for low frustration tolerance and stress levels; and a weak positive ($n = 314$, $r = .167$; $p = .003$) correlation between irrational belief of worthlessness and stress levels. The implication of these findings is that orphaned students are overwhelmed with stress because of their state of irrational beliefs. It is recommended that school counsellors should train orphans in secondary schools on rational beliefs through therapy techniques such as positive self-talk to counter the irrational beliefs.

Keywords: irrational beliefs; orphans; public; secondary schools; stress levels

Introduction

There is confusion regarding who orphans are, their characteristics, the trends in orphan-hood and, most importantly, the specific needs of orphans compared to other children in the community (Sherr, Nagra, Kulubya, Catalan, Clucas & Harding, 2011). Notwithstanding the uncertainty, according to the Joint United Nations Programme on HIV/AIDS (UNAIDS) (2014), an orphan is a child below the age of 18 who has lost one or both parents. According to Rutstein (2008), three categories of orphans exist, namely, maternal, paternal or double orphans. A maternal orphan is a child whose mother has died, a paternal orphan is a child whose father has died and a double orphan is a child who has lost both parents (Rutstein, 2008). In Africa, it is estimated that 34 million children are orphaned, most of them aged between 10 and 14 years. In most African countries the largest number of the children have lost their parents to the Human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) pandemic. Rutstein (2008) reiterates that in sub-Saharan Africa, of the 48,300,000 orphans, 12,000,000 (25%) were orphaned due to AIDS. In southern Africa, the African countries that have relatively large numbers of orphans are Botswana, South Africa, Lesotho and Swaziland (Riggall & Croft, 2016). In east Africa, Kenya has an estimated 2.8 million orphans (Waweru, 2016). Siaya county in Kenya has roughly 22,000 orphans in public secondary schools. Rarieda Sub-County in Kenya where the study was carried out, had about 3,800 orphaned students, of whom 1,000 were double orphans, while 2,800 have lost one parent; 27% of students in secondary schools in Rarieda Sub-County are orphans.

Orphans face numerous challenges. Mwoma and Pillay (2015) report that orphans in South Africa face behavioural problems, low self-esteem, lack of communication with teachers and other learners. Some orphans never stop grieving and often speak about the loss of their parents, and this leads to a feeling of hopelessness or despair at not being able to regain the lost status (Mwoma & Pillay, 2015). The anger borne of feelings of hopelessness among orphans is often turned against the self with harmful results (Cantwell & Carson, 1983). Ntuli, Mokgatle and Madiba (2020) reiterate that orphans are susceptible to long-term psychological problems including depression, anger, anxiety, and feelings of sadness, and are inclined to withdraw and self-isolate. Similarly, Datta (2013) adds that the stress of losing a parent and then being separated from brothers and sisters increases the sense of uncertainty and insecurity about the future and erodes the ability to cope with the new environment and other life challenges. The child feels isolated and may develop withdrawal tendencies, which could put them at heightened risk of developing stress. In general, orphaned children seem socially deprived and they tend to encounter higher emotional distress, hopelessness and frustration (Mbozi, Debit & Munyati, 2006).

However, studies have indicated that some orphaned students exhibit high levels of resilience despite the challenges that they face. Some orphans have demonstrated resilience leading to good psychological health and this has helped them complete their schooling and assist their other siblings as well. For example, Agaje's (2008) study in Ethiopia reported that the majority of orphaned children showed resilience measured by their scores on emotional symptoms, conduct problems, hyperactivity, prosocial behaviour, and total difficulties scores. Similarly, Green, Cho, Gallis and Puffer's (2018) study among orphaned adolescents indicated that school support may buffer the onset or worsening of depression symptoms over time, promoting resilience among an important at-risk population. In addition, Dey and Daliya (2019) agree that there is no significant difference in the level of resilience among orphaned and non-orphaned adolescents. Thwala (2018) adds that some orphans in child- or youth-headed households experience resilience and become independent agents and decision makers in their own right, yet they experience many challenges such as a lack of food security, poverty, and strained extended family relations. Ntuli et al. (2020) conclude that some orphaned students have shown resilience to their condition in different ways and others resort to silence as a coping strategy.

According to McNamara (2000), stress may be conceptualised within three domains, namely, the stimulus-oriented approach, the response-oriented approach, and the transactional oriented approach. Our study was informed by the transactional oriented approach, where individuals filter potentially emotional experiences by appraising the extent to which they believe they can reduce loss, minimise harm, or address challenges and engage in behaviour that specifically affect outcomes (Lazarus, 2007). Lazarus argues for the use of appraising to emphasise active construction of meaning subject to change as situations are re-evaluated and new experiences, information, and beliefs are applied to the constructed meaning. For relevant transactions, appraising leads to three possible variants: harm and loss, threat, and challenge (Lazarus, 2012). Harm and loss occur when damage has already occurred, whereas threat infers the potential for future damage (Lazarus, 2012).

The studies by Datta (2013) and the Rarieda Sub-County Education Office (2019) all indicate that most orphans in the Lake Victoria region in Kenya suffer stress of isolation due to separation from their siblings, especially total orphans, as they have uncertain futures, they live in denial, fear, and are experiencing stigma. Furthermore, the Rarieda Sub-County Education Office (2019) reports that orphans in the region suffer stress of isolation especially when they are separated from their siblings and are taken in by relatives – especially total orphans. Most families find it difficult to meet school-related costs such as purchase of uniforms, books and other materials. In general, orphans in the Rarieda Sub-County undergo stress (Rarieda Sub-County Education Office, 2019), yet previous studies have not explored the stress levels in relation to irrational beliefs and this is the gap that we endeavoured to fill with this study. Related literature on the relationship between irrational beliefs and stress levels among students exists mostly on the general population but very few studies have focused on orphans only. The reviewed studies have varying results in different contexts. It is important to note that most of the previous studies have focused on irrational beliefs and stress levels in general but very few studies were available on orphans specifically. The high stress levels among orphans would make them susceptible to physical, psychological, mental and emotional health issues. To date, research on orphans has focused on, among others, psychological well-being, mental health problems, social, psychological, emotional and behavioural disorders, and psychosocial problems. In Kenya, however, the emotional disturbance being predicted by orphans' irrational beliefs has not been explored. In summary, few studies that have focused on irrational beliefs and stress levels among orphans, and thus, our study would be very important in filling this gap on a Kenyan context. Thus, we investigated the relationship between irrational beliefs and stress levels among orphans in public secondary schools in Rarieda Sub-County of Kenya. The research hypothesis of the study was the following:

H_{01}: *There is no statistically significant relationship between irrational beliefs and stress levels among orphans in public secondary schools.*

Literature Review
The study was informed by the Rational Emotive Behavior Theory (REB) proposed by Albert Ellis in the mid-1950s (David, Lynn & Ellis, 2010). The REB theory is based on the premise that emotional disturbances are mainly caused by irrational ideas experienced by a person, which are not caused by a particular event, but are instead caused by a person's evaluation of such conditions (Bernard, Froh, DiGiuseppe, Joyce & Dryden, 2010; Ellis, 1958). Ellis reports some successful treatment of various kinds of emotional disturbances by persuading clients to change their irrational ideas (Bernard et al., 2010; Ellis, 1958). Ellis proposes 11 irrational behaviour beliefs that can cause emotionally disturbances in individuals, lead to widespread neurosis by making oneself right and others wrong or can make an individual see themselves as wrong and others right by projection (Bernard et al., 2010; Ellis, 1958). Ellis and Dryden (2003) merged the 11 irrational beliefs into four, which they called the

core irrational beliefs around which all other irrational beliefs revolve, namely, demandingness, awfulizing, low frustration tolerance and worthlessness (Bridges & Harnish, 2010).

Demandingness is a strong desire and goals which are mutated into absolute musts, should and demands. Some people also use the musts and should on others saying that he or she should do this or that. If it is not accomplished, the result is anger, rage and uncontrolled behaviour (Ellis & Dryden, 2003). Awfulizing is a kind of negative exaggeration when a minor setback is seen as a major catastrophe or, a feared event is seen as so awful that it seems impossible to endure. When an event or a situation is awfulized, it is thought of in overly negative terms (Ellis & Dryden, 2003). Low frustration tolerance is exaggerated, inconsistent with reality, illogical and someone with low frustration tolerance can never find happiness. It is characterised by procrastinating about doing activities that one knows would turn out beneficial and that one has promised to do (Weinrach, Ellis, DiGiuseppe, Bernard, Dryden, Kassinove, Morris, Vernon & Wolfe, 2006). Worthlessness is the tendency to rate a person's worth by his or her behaviour. It is a belief that reflects the irrational tendency to make global judgement about a person's total self-worth instead of evaluating specific behaviour or actions (Bernard, 2009).

Yumurtaci (2012) indicates that irrational beliefs, social comparison, physical activity level and satisfaction with life predict body image positively whereas the relationship between socially prescribed perfectionism was positive but non-significant among orphans. Buschmann, Horn, Blankenship, Garcia and Bohan (2018) indicate that the irrational belief demandingness represents a primary factor, followed by secondary irrational beliefs as determining factors of the state of orphans. Solomon, Arnow, Gotlib and Wind (2003) indicate that the remitted depressive group held nine times more demand beliefs compared to the non-depressive group which supports Ellis' theory that demandingness beliefs play a key role in the development of depression. Hyland, Shevlin, Adamson and Boduszek (2015) demonstrate that demandingness beliefs indirectly affected the various symptom groups of Post-Traumatic Stress Disorder through a set of secondary irrational beliefs that include catastrophising, low frustration tolerance, and depreciation beliefs.

Vestre and Burnis (1987) reported that the Rational Emotive Therapy model would predict that individuals characterised by high levels of irrational beliefs would evaluate the impact of personally experienced life events as more negative than would individuals characterised by low levels of irrational beliefs. In Iran, Khaledian, Saghafi, Pour and Moradian (2013) revealed that there was a positive significant relationship between orphaned students' irrational beliefs with anxiety. They concluded that the more the irrational beliefs, the more the anxiety. Dilorenzo, David and Montgomery (2011) reveal that specific irrational beliefs at the exam period were positively related to general distress ($r = -.33, p < .05$) at the exam period. Vîslă, Flückiger, Holtforth and David (2016) found that irrational beliefs and distress are moderately connected to each other; this relationship remains significant even after controlling for several potential covariates. Yıldız, Baytemir and Demirtaş (2018) report that the relationship between awfulizing irrational beliefs and perceived stress was found statistically significant. In Serbia, Popov, Popov and Damjanović (2015) indicate that both stressors and irrational beliefs have a direct effect on general stress among teachers. Bora, Bernard, Trip, Descei-Radu and Chereji (2009) report that low frustration tolerance irrational beliefs of teachers correlate significantly and positively with distress variables such as role-related stress. Bhing-Leet (2004) showed that the intensity of irrational beliefs was unrelated to stress levels among occupational therapists. In particular, low frustration tolerance was associated with stress regarding patient contact and irrationality in self-worth was associated with stress pertaining to rewards and recognition as well as to professional value. Boyacioglu and Kukuk (2011) found that children in Turkey who explained a negative situation with consistent, permanent and situation inherent reasons experienced more despair and were more likely to succumb to depression.

Cluver and Gardner's (2006) study in Cape Town indicates that orphans are more likely to have constant nightmares, and scored highly for Post-Traumatic Stress Disorder. Kuo, Reddy, Operario, Cluver and Stein's (2013) study among orphaned children in an HIV-endemic South African community showed high numbers of individuals reporting traumatic events. Cluver, Gardner and Operario's (2007) study in South Africa reported that children orphaned by AIDS were more likely to report symptoms of depression and post-traumatic stress. Wild, Flisher, Laas and Robertson's (2006) study in the Eastern Cape province of South Africa showed that adolescents orphaned as a result of deaths unrelated to AIDS reported more depression and anxiety.

Methods
Study Design
In this study we adopted a cross-sectional correlation research design. This design enables a researcher to observe two or more variables at a point in time and is useful for describing a relationship between two or more variables (Breakwell, Hammond & Fife-Schaw, 1995). This research design was appropriate for our study because it made it possible to quantitatively assess

the nature of relationships between irrational beliefs and stress levels among orphaned students.

Participants

The population of this study comprised 3,542 orphaned students in the 46 public secondary schools who were drawn from Form 1 to Form 4 and included girls and boys. A sample of 350 double orphaned students in secondary schools was obtained. The sample of 350 double orphaned students was 10% of the accessible population. This was appropriate for generalisations as is recommended by Kerlinger (1983) that a sample of 10% is large enough as long as it allows for reliable data. In addition, Ross (2004) suggests that if parametric tests are to be employed, then the sample size should be in the range 30 to 500 and this would be the necessary sample size valid for the selection of a sample using random sampling techniques. Similarly, Jwan (2010) recommends that a sample of between 10% and 30% of the total population forms an adequately representative sample. Both purposive and simple random sampling techniques were used to obtain the study participants. Within a given school, we recruited the double orphans using the purposive sampling method, after which simple random sampling was used to identify the sample size of double orphaned students to participate in the study. We visited the selected schools and explained the purpose of the study to the orphaned students. Since the orphans were below 18 years, they were issued with consent forms to take to the parents, after which, they returned the signed consent forms indicating that parental consent was adhered to. The simple random sampling method was used in order to provide each student with an equal opportunity for selection to participate in the study (Suresh, Thomas & Suresh, 2011).

Tools

The Irrational Belief Inventory (IBI) and Perceived Stress Scale (PSS) were used to collect data. The IBI, invented by Koopmans, Sanderman, Timmerman and Emmelkamp (1994), was adapted and used to collect data on orphaned students' irrational beliefs. It is a 50-item self-report measure used to assess irrational beliefs (Bridges & Harnish, 2010). A 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was provided for respondents to demonstrate a level agreement for each item. The PSS developed by Cohen, Karmarck and Mermelstein (1983) was adapted (Manzar, Salahuddin, Peter, Alghadir, Anwer, Bahammam & Pandi-Perumal, 2019) and used to measure stress levels among orphans in the Kenyan context. It is a 10-item scale recommended for examining the stress levels that one experiences. Participants were asked to rate their stress levels experienced over the last months using a 5 point-Likert scale ranging from 1 (Never) to 5 (Very Often). Both the IBI and the PSS were adapted to suit the Kenyan context. A pilot study was conducted to improve external validity of the questionnaires.

Reliability of the questionnaires was ensured by using Cronbach's alpha. The reliability results indicate that all the sub-scales met the required level of internal consistency of reliability, with the Cronbach's alpha values ranging from 0.672 to 0.756. These values of Cronbach's alpha were considered appropriate because Fraenkel and Wallen (2009) recommend that a coefficient of 0.60 is of an average reliability while a coefficient of 0.70 and above should indicate that the instrument has a high inter-item consistency reliability standard. Internal validity of the questionnaires was tested by subjecting the survey data to suitability tests using the Kaiser-Meyer-Oklin measure of sampling adequacy (KMO Index) and the Bartlett's Test of Sphericity. This KMO index of the constructs was reported to be between 0.712 and 0.752, indicating that all the scales had appropriate internal validity. Creswell (2014) affirms that the KMO measure of sampling adequacy index ranging above 0.6 is of adequate internal validity.

Procedures

Ethical clearance to conduct the study was first obtained from the National Commission for Science Technology and Innovation (NACOSTI) of Kenya (NACOSTI/P/3695). We then obtained permission from the principals of the selected secondary schools to collect data from the orphaned students in their schools. The procedure for collecting data entailed gaining access to schools, presentation oneself and becoming acquainted with the research subjects, the data collection procedure and data collection instruments. The orphaned students took 30 minutes to complete the questionnaires after which they were collected by us.

Analysis

The quantitative data from the questionnaires were analysed using descriptive and inferential statistics. Descriptive statistics was used to summarise data in the form of tables, charts, frequencies and percentages. Inferential statistics was used to help make inferences and draw conclusions. Statistical tests including Pearson's Correlation and regression analysis were used. Normality of data was confirmed after which the parametric tests were used in the analysis.

Results

Demographic Information

In this study we investigated the background information of the respondents. We were of the opinion that this information was important because the respondents' background in relation to the study determined the ability to possess the required

information. In addition, the demographic information, which investigated bio-data regarding the respondents' characteristics, was considered necessary for the determination of whether the respondents were a representative sample of the target population for generalisation of the results of the study. Table 1 shows the information on gender and age of the respondents in the survey.

Table 1 Personal bio-data of the student respondents

Bio-data	Count	Percentage	Cumulative percentage
		Gender	
Male	160	51.0	51.0
Female	154	49.0	100.0
Total	314	100.0	
		Age	
Below 15	35	11.1	11.1
15–17	195	62.1	73.2
18–20	71	22.6	95.8
Above 20	13	4.2	100.0
Total	314	100.0	

Table 1 shows that 160 of the respondents (51.0%) were male, while 154 (49%) were female. The results show that disparity of numbers in terms of gender among the students was not very glaring. This was found to be in line with United Nations Children's Fund (UNICEF, 2019) that established that in Kenyan secondary schools 51.6% of enrolled students were male and 48.4% female.

Thirty-five respondents (11.1%) were younger than 15 years, while the majority (62.1%) of respondents were between 15 and 17 years. This was not surprising as most students in Kenyan secondary schools are between 15 and 17 years old. However, students of other ages were also represented among the students. Slightly more than a fifth (22.6%) of the students were between 18 and 20 years, while a further 13 (4.2%) were over 20 years old. Students over the age of 20 years in schools was as a result of the return to school policy enacted by the Kenyan Government in 2003 (Aloka, 2012).

The respondents were also required to indicate their classes. The results are shown in Figure 1.
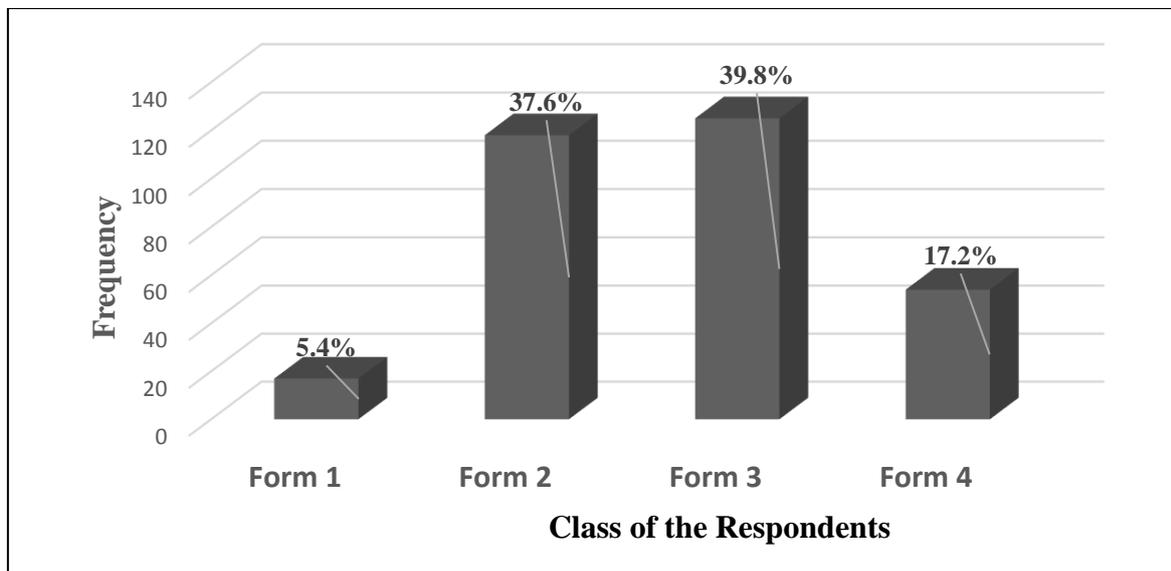

Figure 1 Classes of the student respondents

The information presented in Figure 1 indicates that 39.8% of orphans were in Form 3 and 37.6% in Form 2. In addition, 17.2% of the orphans were in Form 4, while the minority (5.4%) was in Form 1. In terms of representation across academic years, these figures are indicative of full representation of all classes, even if the majority was in Forms 3 and 2. This is indicative of the fact that orphanhood never discriminated any class.

Overall, the demographic information reveals that orphans of both genders, varying age groups, classes and type of schools were represented in the study, implying that the influence of intervening factors (respondents' background) on the relationship between irrational belief and students' stress levels had, therefore, been significantly excluded from the study. The biographical data of the orphaned students correlate with feelings and

thoughts that influence their irrational beliefs and by extension, perceived stress levels. In addition, the fact that students with varied bio data characteristics were represented in the study implies that the results of this study can be generalised across the orphaned student population in secondary schools in Rarieda Sub-County with very minimal precautions.

Correlation between Irrational Beliefs and Stress Levels

The results were subjected to a hypothesis testing using a Pearson's Product Moment correlation model. The hypothesis was stated as follows:

H_o: *There is no statistically significant relationship between irrational beliefs and stress levels among orphans in public secondary schools*

A correlative analysis was conducted by computing Pearson's Product Moment Correlation Coefficient

to establish the magnitude and direction of relationship between the two variables (irrational beliefs and stress levels). The irrational beliefs were used as the independent variable and orphaned students' stress levels as dependent variable. The scores of the variables from the Likert scale were all converted into a continuous scale, where high scale ratings implied high perceived levels of irrational beliefs and stress levels. The significant level (*p*-value) was set at .05, such that if the *p*-value was less than 0.05, the null hypothesis would be rejected and conclusion reached that a significant difference does exist. If the *p*-value was larger than 0.05, it would be concluded that a significant difference does not exists. Table 2 shows the correlation analysis results in Statistical Package for the Social Sciences (SPSS) output.

Table 2 Correlational analysis between irrational beliefs and stress levels

	Irrational beliefs	Stress level
Demandingness	Pearson correlation	0.149*
	Significance (sig.) (2-tailed)	.008
	N	314
Awfulizing	Pearson correlation	0.243*
	Sig. (2-tailed)	.000
	N	314
Frustration tolerance	Pearson correlation	0.191*
	Sig. (2-tailed)	.001
	N	314
Worthlessness	Pearson correlation	0.167*
	Sig. (2-tailed)	.003
	N	314

Note. *Correlation is significant at the 0.05 level (2-tailed).

The results in Table 2 indicate that there was a weak positive ($n = 314$, $r = .149$; $p = .008 < .05$) correlation between demandingness and stress levels; a weak positive relationship between irrational belief for demandingness and stress levels; a weak but positive ($n = 314$, $r = .243$; $p < .05$) correlation between irrational belief for awfulizing and stress levels; and finally, a weak positive ($n = 314$, $r = .191$; $p < .05$) correlation between irrational belief for low frustration tolerance and stress levels. The correlation analysis established a weak positive ($n = 314$, $r = .167$; $p = .003$) correlation between the irrational belief of worthlessness and stress levels. Since the *p*-values obtained were all less than 0.05, the null hypothesis, "*There is no statistically significant relationship between irrational beliefs and stress levels among orphans in public secondary schools*", was rejected. It was then concluded that higher scores in irrational beliefs would lead to high stress levels among orphans in public secondary schools.

Multiple Regression Analysis Results

We sought to establish a linear model that could be used to describe the predicted optimal level of orphan students' stress levels given various aspects of irrational belief. This was done by use of standard multiple regression analysis, where the four independent variables were factored in the model at once. A multiple-regression was suitable because it could help to investigate how well the set of independent variables was able to predict the orphan students' stress levels. The analysis provided information about the relative contribution of each of the variables that make up the model. Each independent variable was evaluated in terms of its predictive power, over and above that offered by all the other independent variables. It enabled us to know how much unique variance, in the dependent variable, each of the independent variables explained. Table 3 shows a regression analysis model summary from SPSS output.

Table 3 Regression analysis model summary output: Orphans' irrational belief on stress levels

Model	R	R^2	Adjusted R^2	*SE* of the estimate	Durbin-Watson
1	.379	.144	.133	.24237	2.154

Note. Predictors: (Constant), Irrational belief frustration tolerance, Irrational belief awfulizing, Irrational belief worthlessness, Irrational belief demandingness. Dependent variable: Stress level.

In Table 3 the "*R*" column represents the value of *R*, the multiple correlation coefficients, which is a measure of the quality of the prediction of the dependent variable (stress levels) among secondary school orphan students in Rarieda Sub-County. The value of .379 indicates a moderate level of prediction. However, the value of *R* square (.144) indicates how much of the variance in the students' stress level was explained by the irrational belief variables. This value expressed as a percentage means that the model accounted for 14.4% of the variance in students' stress levels. This is the proportion of variance in the student stress levels that is explained by irrational belief factors. It is the proportion of variation accounted for by the regression model above and beyond the mean model. However, ANOVA was used to assess the statistical significance of the results as shown in Table 4.

Table 4 ANOVA irrational belief and stress levels among the orphans

	Model	SS	df	MS	F	Sig.
	Regression	3.048	4	.762	12.973	.000
1	Residual	18.152	309	.059		
	Total	21.200	313			

Note. Dependent variable: Stress level. Predictors: (Constant), Irrational belief frustration tolerance, Irrational belief awfulizing, Irrational belief worthlessness, Irrational belief demandingness.

The ANOVA was used to test the null hypothesis that multiple *R* in the population equals 0. From Table 5, it is evident that the model reached statistical significance [$F (4, 309) = 12.973$, $R^2 = .144$, sig. $< .05$] implying that the irrational beliefs model was adequate enough to explain the variance in students' stress levels. In other words, the results show that the irrational beliefs by orphan students significantly predicted the stress level, meaning the regression model was a good fit of the data.

Evaluating Contribution of Each of the Independent Variables

We sought to investigate the contribution of individual irrational beliefs variables factored in the model in the prediction of the student' stress levels. This was shown by coefficient values which revealed that each independent variable contributed differently to the model, as in Table 5.

Table 5 Coefficient output: Irrational belief and stress levels

	Model	Unstandardised coefficients		Standardised coefficients			95.0% Confidence interval for B	
		B	SE	β	t	Sig.	Lower bound	Upper bound
1	(Constant)	1.710	.185		9.257	.000	1.347	2.074
	Irrational belief worthlessness	.088	.029	.160	3.042	.003	.031	.145
	Irrational belief demandingness	.091	.031	.156	2.931	.004	.030	.152
	Irrational belief awfulizing	.131	.030	.227	4.304	.000	.071	.191
	Irrational belief frustration tolerance	.116	.030	.202	3.811	.000	.056	.175

Note. Dependent variable: Stress level.

To compare the level of influence of different irrational beliefs on stress levels among orphan students, a standardised coefficient was used because the values for each of the different variables were converted to the same scale so that they could be easily compared. From the model it is evident that the independent variables contributed differently in influencing students' stress levels. For example, irrational belief awfulizing had the highest influence on stress levels, while irrational belief of demandingness made the least contribution in explaining the variability of the stress levels among the orphan students. The variable irrational belief awfulizing had the largest beta coefficient of .227, implying that it made the strongest unique contribution in explaining the variability in students' stress levels.

The Regression Model

A regression model for the relationship between these independent variables and dependent variable is shown below. This model was appropriate because each of the explanatory variables was independent and non-mutually exclusive.

In this model: $Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon$.

Where: Y is students' level of stress

X_1 Irrational belief of worthlessness

X_2 Irrational belief of demandingness

X_3 Irrational belief of awfulizing

X_4 Irrational belief frustration tolerance
1.710 *units* $+ 0.088x_1$ *units* $+ 0.091$ x_2 *units* $+ 0.131$ x_3 *units* $+ 0.116x_4$ units $+$ error
From the equation, the coefficients indicate how much the student stress levels varied with each type of irrational belief variable when all other independent variables were kept constant. For example, the unstandardised coefficient, X_1, for irrational belief of worthlessness was equal to 0.088 which means that for each one-unit increase in irrational belief worthlessness, there was an increase in the stress levels by 0.088 units and vice versa. Similarly, for each one-unit increase in irrational belief of awfulizing, there was a rise in students' stress levels of 0.131 units. In general, noting that all the variables were statistically significant, it was concluded that the model was adequate to predict stress levels among orphans in secondary schools; it was statistically significant F (4, 309) = 12.973, R^2 = .144, sig. < .05. This indicates that 14.4% of the variability in student stress levels can be explained by the students' irrational beliefs. Other variables not captured in the study could explain the remaining portion, not accounted for by the model.

Discussion

In this study we investigated the relationship between irrational beliefs and stress levels among orphans in public secondary schools. The findings established a weak but positive ($n = 314$, $r = .149$; $p = .008 < .05$) correlation between irrational belief for demandingness and stress levels; a weak but positive ($n = 314$, $r = .243$; $p < .05$) correlation between irrational belief for awfulizing and stress levels; a weak but positive ($n = 314$, $r = .191$; $p < .05$) correlation between irrational belief for low frustration tolerance and stress levels; and a weak but positive ($n = 314$, $r = .167$; $p = .003$) correlation between irrational belief of worthlessness and stress levels. The results imply that irrational beliefs among orphan learners reduced their emotional stability and thus their stress levels increased as a result. This finding is supported by the Ellis Rational Emotive Theory perspective which indicates that irrational behaviour beliefs that can cause emotionally disturbance in individuals lead to widespread neurosis by making oneself right and others wrong or can make an individual regard themselves as wrong and others right by projection (Bernard et al., 2010; Ellis, 1958). The implication of this finding is that irrational beliefs created emotional disturbances among orphans and this induced high stress levels in them.

The findings from the regression analysis indicate that the model was adequate to predict stress levels among orphans in secondary schools since 14.4% of the variability in orphaned student stress levels was explained by the students' irrational beliefs. Buschmann et al. (2018) agree that low frustration tolerance contributed unique variance to anxious and depressive affect that was not fully mediated by automatic thoughts. In the same vein, Hyland et al. (2015) and Solomon et al. (2003) report that demandingness beliefs play a key role in the development of depression. Vestre and Burnis (1987) also report that high levels of irrational beliefs would evaluate the impact of personally experienced life events as more negative than would the individuals characterised by low levels of irrational beliefs. Dilorenzo et al. (2011), Khaledian et al. (2013), Vîslă et al. (2016) and Yıldız et al. (2018), all report a positive significant relationship between irrational belief and anxiety, dysfunctional distress, distress and awfulizing respectively. Likewise, the study findings were consistent with the findings of Popov et al. (2015) whose study indicated that both stressors and irrational beliefs had a direct effect on general stress among teachers. Bora et al. (2009) also report that low frustration tolerance irrational beliefs of teachers correlate significantly and positively with distress variables such as role-related stress. Boyacioglu and Kukuk (2011) agree that orphaned children who explain a negative situation with consistent, permanent and situation inherent reasons experience more despair and are more likely to succumb to depression. However, the results of the study disagree with those of Bhing-Leet (2004) which reported that the intensity of irrational beliefs was unrelated to stress levels among occupational therapists. The implication of this finding is that school counsellors should pay more attention to orphaned students in schools.

The results also show that orphan student's irrational beliefs significantly predicted stress level, meaning the regression model was a good fit of the data. The irrational belief awfulizing had the highest influence on stress level, while irrational belief of demandingness made the least contribution in explaining the variability of the stress levels among the orphan students. The findings concur with those of Yıldız et al. (2018) which report that awfulizing irrational beliefs and perceived stress were statistically significant. Boyacioglu and Kukuk (2011) also agree that children who explain a negative situation with consistent, permanent and situation inherent reasons experience more despair and are more likely to succumb to depression. However, the findings disagree with Buschmann et al. (2018) who report that demandingness represents a primary factor, followed by the secondary irrational beliefs in predicting depressive automatic thoughts. These findings are also contrary to several studies which have demonstrated that despite their situations, orphans are resilient. For example, Agaje (2008), Green et al. (2018) and Thwala (2018) all agree that some orphans have developed resilience and have been able to overcome their challenges of being heads of households. Dey and Daliya (2019) and Ntuli et al. (2020) conclude that some orphaned

students have showed resilience to their condition in different ways and, therefore, have adopted various mechanisms to overcome the challenges of orphanhood that they experience. Even though the results indicate that irrational beliefs are possible causes of stress levels among orphans, other literature indicates that some orphans remain resilient despite their conditions. Therefore, the implication of the results from these studies is that it would be important to understand the resilience patterns among orphans in their response to stressful events.

Conclusion

With this study we examined the relationship between irrational beliefs and stress levels among orphans in public secondary schools. From the study findings, it is concluded that most orphans' stressful conditions could be attributed to their state of irrational beliefs. However, literature also indicates that some orphans are resilient and thus they hold rational beliefs that make them navigate issues of life amicably. The greatest predictor of stress levels among orphans was awfulizing irrational beliefs, while the irrational belief of demandingness made the least contribution in explaining the variability of stress levels among the orphan students. This indicates that awfulizing irrational belief in which individuals perceive a bad, unfortunate circumstance as being worse than it is, result in orphans being highly stressed. However, demandingness irrational beliefs which occur when orphans believe that the things must or should absolutely be a certain way, has the least effect on orphans' stress levels. From the study, we further conclude that enhancing rational beliefs among orphaned learners would result in them having manageable stress levels.

The study limitation was that the schools where the research was done were government sponsored but they had varied support programmes for orphaned students. Therefore, a study which involves orphans in public secondary schools with almost similar support programmes should be carried out. Secondly, the study was limited to students in secondary schools, but it excluded orphans in primary schools, thus, a study involving learners in primary schools is recommended.

It is recommended that teacher counsellors should train orphans in secondary schools on rational beliefs through therapy techniques such as positive self-talk to counter irrational beliefs. In addition, school counsellors should develop a strategy of assessing the irrational beliefs of orphans in schools to identify the ones at risk of possessing irrational beliefs. Future studies could also investigate the gender differences on irrational beliefs among students in secondary schools.

Authors' Contributions
Millicent wrote the manuscript and provided data for all tables and figures. Peter and Washington read through the manuscript and interpreted the results. All authors reviewed the final manuscript.

References

Agaje SW 2008. Resilience among children exposed to traumatic loss. A study of children orphaned by AIDS in Addis Ababa, Ethiopia. MPhil thesis. Oslo, Norway: University of Oslo. Available at https://www.duo.uio.no/handle/10852/18460. Accessed 31 December 2021.

Aloka PJO 2012. Group polarization in decision making: A study of selected secondary school disciplinary panels in Rongo District of Kenya. PhD thesis. Bellville, South Africa: University of the Western Cape. Available at http://etd.uwc.ac.za/xmlui/handle/11394/3294. Accessed 31 December 2021.

Bernard ME 2009. Dispute irrational beliefs and teach rational beliefs: An interview with Albert Ellis. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 27(1):66–76. https://doi.org/10.1007/s10942-009-0089-x

Bernard ME, Froh JJ, DiGiuseppe R, Joyce MR & Dryden W 2010. Albert Ellis: Unsung hero of positive psychology. *The Journal of Positive Psychology*, 5(4):302–310. https://doi.org/10.1080/17439760.2010.498622

Bhing-Leet T 2004. Irrational beliefs and job stress among occupational therapists in Singapore. *British Journal of Occupational Therapy,* 67(7):303–309. https://doi.org/10.1177/030802260406700704

Bora C, Bernard ME, Trip S, Decsei-Radu A & Chereji S 2009. Teacher Irrational Belief Scale – Preliminary norms for Romanian population. *Journal of Cognitive and Behavioral Psychotherapies*, 9(2):211–220. Available at https://www.researchgate.net/profile/Simona-Trip/publication/287485365_Teacher_irrational_belief_scale_-_Preliminary_norms_for_romanian_population/links/568b7c3a08ae1975839e6c6c/Teacher-irrational-belief-scale-Preliminary-norms-for-romanian-population.pdf. Accessed 31 December 2021.

Boyacioglu N & Kukuk L 2011. Irrational beliefs and test anxiety in Turkish school adolescents. *The Journal of School Nursing*, 27(6):447–454. https://doi.org/10.1177/1059840511417631

Breakwell GM, Hammond S & Fife-Schaw C (eds.) 1995. *Research methods in psychology*. Thousand Oaks, CA: Sage.

Bridges KR & Harnish RJ 2010. Role of irrational beliefs in depression and anxiety: A review. *Health*,

2(8):862–877.
https://doi.org/10.4236/health.2010.28130

Buschmann T, Horn RA, Blankenship VR, Garcia YE & Bohan KB 2018. The relationship between automatic thoughts and irrational beliefs predicting anxiety and depression. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 36:137–162. https://doi.org/10.1007/s10942-017-0278-y

Cantwell DP & Carson GA 1983. *Affective disorders in childhood and adolescence: An update*. New York, NY: SP Medical & Scientific Books.

Cluver L & Gardner F 2006. The psychological well-being of children orphaned by AIDS in Cape Town, South Africa. *Annals of General Psychiatry*, 5:Art. 8, 9 pages. https://doi.org/10.1186/1744-859X-5-8

Cluver L, Gardner F & Operario D 2007. Psychological distress amongst AIDS-orphaned children in urban South Africa. *The Journal of Child Psychology and Psychiatry*, 48(8):755–763. https://doi.org/10.1111/j.1469-7610.2007.01757.x

Cohen S, Kamarck T & Mermelstein R 1983. A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4):385–396.

Creswell JW 2014. *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed). Thousand Oaks, CA: Sage.

Datta D 2013. Protecting rights of orphan and vulnerable children: No substitute for community action in Nyanza, Kenya. *Community Development Journal,* 48(1):105–118. https://doi.org/10.1093/cdj/bss002

David D, Lynn SJ & Ellis A (eds.) 2010. *Rational and irrational beliefs: Research, theory, and clinical practice*. New York, NY: Oxford University Press.

Dey P & Daliya BR 2019. The effect of resilience on the psychological well-being of orphan and non-orphan adolescents. *Indian Journal of Mental Health*, 6(3):253–260. Available at http://indianmentalhealth.com/pdf/2019/vol6-issue3/FULL_ISSUE.pdf#page=17. Accessed 31 December 2021.

Dilorenzo T, David D & Montgomery GH 2011. The impact of general and specific rational and irrational beliefs on exam distress; A further investigation of the binary model of distress as an emotional regulation model. *Journal of Cognitive and Behavioral Psychotherapies*, 11(2):121–142. Available at https://www.proquest.com/docview/1010415589?pq-origsite=gscholar&fromopenview=true. Accessed 31 December 2021.

Ellis A 1958. Rational psychotherapy. *The Journal of General Psychology*, 59(1):35–49. https://doi.org/10.1080/00221309.1958.9710170

Ellis A & Dryden W 2003. *Albert Ellis live*. London, England: Sage.

Fraenkel JR & Wallen NE 2009. *How to design and evaluate research in education* (7th ed). New York, NY: McGraw-Hill.

Green EP, Cho H, Gallis J & Puffer ES 2018. The impact of school support on depression among adolescent orphans: A cluster-randomized trial in Kenya. *The Journal of Child Psychology and Psychiatry*, 60(1):54–62. https://doi.org/10.1111/jcpp.12955

Hyland P, Shevlin M, Adamson G & Boduszek D 2015. Irrational beliefs in posttraumatic stress responses:

A rational emotive behavior therapy approach. *Journal of Loss and Trauma*, 20(2):171–188. https://doi.org/10.1080/15325024.2013.839772

Jwan J 2010. *Conducting qualitative research: Current trends and developments*. Paper presented at the Moi University 5th Campus Wide Research Workshop, Mombasa, Kenya, 5–8 April.

Kerlinger FN 1983. *Foundations of behavioral research* (2nd ed). New Delhi, India: Surjeet Publications.

Khaledian M, Saghafi F, Pour SH & Moradian OA 2013. Investigating the relationship of irrational beliefs with anxiety in Iranian college students (Case study: Under graduate college students of Azad University and Payam Nour University). *Journal of Basic and Applied Scientific Research*, 3(3):759–764. Available at https://www.researchgate.net/profile/Fatemeh-Saghafi/publication/280302746_Investigating_the_Relationship_of_Irrational_Beliefs_with_Anxiety_in_Iranian_Collage_Students/links/55b08fea08ae32092e071035/Investigating-the-Relationship-of-Irrational-Beliefs-with-Anxiety-in-Iranian-Collage-Students.pdf. Accessed 31 December 2021.

Koopmans PC, Sanderman R, Timmerman I & Emmelkamp PMG 1994. The Irrational Beliefs Inventory (IBI): Development and psychometric evaluation. *European Journal of Psychological Assessment*, 10(1):15–27.

Kuo C, Reddy MK, Operario D, Cluver L & Stein DJ 2013. Posttraumatic stress symptoms among adults caring for orphaned children in HIV-endemic South Africa. *AIDS and Behavior*, 17(5):1755–1763. https://doi.org/10.1007/s10461-013-0461-9

Lazarus RS 2007. Stress and emotion: A new synthesis. In A Monat, RS Lazarus & G Reevy (eds). *The Praeger handbook on stress and coping* (Vol. 1). Westport, CT: Praeger.

Lazarus RS 2012. Evolution of a model of stress, coping, and discrete emotions. In VH Rice (ed). *Handbook of stress, coping, and health: Implications for nursing research, theory, and practice* (2nd ed). Thousand Oaks, CA: Sage.

Manzar MD, Salahuddin M, Peter S, Alghadir A, Anwer S, Bahammam AS & Pandi-Perumal SR 2019. Psychometric properties of the perceived stress scale in Ethiopian university students. *BMC Public Health*, 19:41. https://doi.org/10.1186/s12889-018-6310-z

Mbozi PS, Debit MB & Munyati S (eds.) 2006. *Psychosocial conditions of orphans and vulnerable children in two Zimbabwean districts*. Cape Town, South Africa: HSRC Press.

McNamara S 2000. *Stress in young people: What's new and what can we do?* London, England: Continuum.

Mwoma T & Pillay J 2015. Psychosocial support for orphans and vulnerable children in public primary schools: Challenges and intervention strategies. *South African Journal of Education*, 35(3):Art. # 1092, 9 pages. https://doi.org/10.15700/saje.v35n3a1092

Ntuli B, Mokgatle M & Madiba S 2020. The psychosocial wellbeing of orphans: The case of early school leavers in socially depressed environment in Mpumalanga Province, South Africa. *PloS One*, 15(2):e0229487.

https://doi.org/10.1371/journal.pone.0229487

Popov S, Popov B & Damjanović R 2015. The role of stressors at work and irrational beliefs in the prediction of teachers' stress. *Primenjena Psihologija*, 8(1):5–23. Available at https://www.researchgate.net/profile/Stanislava-Popov/publication/275522629_THE_ROLE_OF_S TRESSORS_AT_WORK_AND_IRRATIONAL_ BELIEFS_IN_THE_PREDICTION_OF_TEACHE RS'_STRESS/links/5a72d8be45851551207676c8/T HE-ROLE-OF-STRESSORS-AT-WORK-AND-IRRATIONAL-BELIEFS-IN-THE-PREDICTION-OF-TEACHERS-STRESS.pdf. Accessed 31 December 2021.

Rarieda Sub-County Education Office 2019. *Report on the plight of orphans in secondary schools in Rarieda*. Unpublished manuscript.

Riggall A & Croft A 2016. *Eastern and Southern Africa regional study on the fulfilment of the right to education of children with disabilities*. Berkshire, England: Education Development Trust. Available at https://www.unicef.org/esa/media/1721/file/UNIC EF-EDT-Regional-2016-children-with-disabilities.pdf. Accessed 31 December 2021.

Ross MR 2004. *Introduction to probability and statistics for engineers and scientists* (3rd ed). San Diego, CA: Elsevier Academic Press.

Rutstein SO 2008. *Finding the missing maternal and paternal orphans*. Calverton, MD: Macro International. Available at https://preview.dhsprogram.com/pubs/pdf/OD53/O D53.pdf. Accessed 31 December 2021.

Sherr L, Nagra N, Kulubya G, Catalan J, Clucas C & Harding R 2011. HIV infection associated post-traumatic stress disorder and post-traumatic growth – A systematic review. *Psychology, Health & Medicine*, 16(5):612–629. https://doi.org/10.1080/13548506.2011.579991

Solomon A, Arnow AB, Gotlib IH & Wind B 2003. Individualized measurement of irrational beliefs in remitted depressives. *Journal of Clinical Psychology*, 59(4):439–455. https://doi.org/10.1002/jclp.10081

Suresh K, Thomas SV & Suresh G 2011. Design, data analysis and sampling techniques for clinical research. *Annals of Indian Academy of Neurology*, 14(4):287–290. https://doi.org/10.4103/0972-2327.91951

Thwala SK 2018. Experiences and coping strategies of children from child-headed households in Swaziland. *Journal of Education and Training Studies*, 6(7):150–158. https://doi.org/10.11114/jets.v6i7.3393

Vîslă A, Flückiger C, Holtforth M & David D 2016. Irrational beliefs and psychological distress: A meta-analysis. *Psychotherapy and Psychosomatics*, 85(1):8–15. https://doi.org/10.1159/000441231

Yıldız MA, Baytemir K & Demirtaş AS 2018. Irrational beliefs and perceived stress in adolescents: The role of self-esteem. *Journal of Educational Sciences & Psychology*, VIII(LXX):79–89. Available at https://www.researchgate.net/profile/Kemal-Baytemir-2/publication/325296945_Irrational_beliefs_and_p erceived_stress_in_adolescents_the_role_of_self-esteem/links/5ebea8cd92851c11a868caca/Irrationa l-beliefs-and-perceived-stress-in-adolescents-the-role-of-self-esteem.pdf. Accessed 31 December 2021.

Yumurtaci D 2012. Predictors of body image among university students. M.Sc. thesis. Ankara, Turkey: Middle East Technical University. Available at https://open.metu.edu.tr/bitstream/handle/11511/22 018/index.pdf. Accessed 31 December 2021.

UNAIDS 2014. *Fact sheet 2014 - Global statistics*. Available at https://unaids-test.unaids.org/sites/default/files/unaids/contentass ets/documents/factsheet/2014/20140716_FactSheet _en.pdf. Accessed 31 December 2021.

United Nations Children's Fund 2019. *Global annual results reports 2018*. Available at https://www.unicef.org/reports/global-annual-results-2018. Accessed 31 December 2021.

Vestre ND & Burnis JJ 1987. Irrational beliefs and the impact of stressful life events. *Journal of Rational Emotive Therapy*, 5:183–188. https://doi.org/10.1007/BF01080526

Weinrach SG, Ellis A, DiGiuseppe R, Bernard ME, Dryden W, Kassinove H, Morris GB, Vernon A & Wolfe J 2006. Rational emotive behavior therapy after Ellis: Predictions for the future. *Journal of Rational-Emotive and Cognitive-Behavior Therapy,* 24:199. https://doi.org/10.1007/s10942-006-0045-y

Wild L, Flisher A, Laas S & Robertson B 2006. *Psychosocial adjustment of adolescents orphaned in the context of HIV/AIDS*. [Poster]. 19th biennial meeting of the International Society for the Study of Behavioural Development, 2–6 July, Melbourne, Australia.