Identification of Treatment Interventions that Enhance Resilience in Delinquent Adolescent Girls in a Therapeutic Camp Program

Introduction

Background

There is an abundance of published research identifying the ameliorating effects of adolescent resilience in reducing the degree of delinquent behavior in youth who would otherwise be prone to such behavior. On the other hand, there is a much more limited number of reported studies reviewing those interventions or processes which have proven to facilitate the growth of resilience in adolescents.

The relationship of resilience to the promotion of prosocial behavior and its effect on the risk of delinquency:

For over twenty years studies have identified a range of factors that provide a moderating effect on the risk factors associated with anti-social behavior. Hoge & Andrews, (1996) studied 338 delinquent youth and although they found that negative relations between the youth and parents were associated with higher levels of reoffending and overall poor adjustment they were able to identify four protective variables that were associated with fewer offenses and better overall adjustment. These variables included positive peer relations, good educational achievement, positive response to authority and the effective use of leisure time. They did not identify these moderating factors as "resilience" factors however their discussion of effects was very similar to others who labeled such moderating factors as elements of "resilience."

"Resilience" has been generally defined as the ability to successfully cope or overcome risk and adversity (Doll & Lyons, 1998). McKnight & Loper, (2002) accepted this concept as the basis of studying 2580 adolescent girls and found that at least six resilience factors related to a decrease in involvement in delinquent behavior. These included the desire to go to college, the absence of drug use, feeling loved and wanted, a belief that teachers treated them fairly, a belief that their parents trusted them and religiosity.

More recently there have been a number of studies that examined the relationship of resilience to poor outcomes in adolescents. Ernestus & Prelow (2015) examined 930 young adolescents randomly drawn from a set of African American and Latino families living in low income neighborhoods in Boston, Chicago and San Antonio. Data were collected when they were 10-14 years of age and then later when they were 15-20. Close to 51% were female and the study found that "…some resilient ecological systems factors, such as at the family level, may provide a buffering effect that helps increase resilience in the face of high neighborhood risk." (Ernestus & Prelow, p. 1002).

Mansouri, Mousavi-Nasab, & Valle, (2015) studied a sample of 400 female high school students ages 15-18. They found that resilience had a significant mediating role in the relationship between personality traits and attitudes towards delinquency. In particular, they found a positive relationship between resilience and a negative attitude toward delinquency.

Modecki, Zimmer-Gemback, & Guerra (2017) carried out a detailed review of literature related to factors that led to adolescents externalizing behavior problems. They found that problems in emotional regulation, coping

and decision making were as a group, closely associated with the externalization process, and improvement in all three areas is critical to preventing or reducing behavior problems in adolescents. These three factors can be considered partial measures of resilience. Based on over six decades of research on risk and resilience and an analysis of 11 major studies on the subject, Luthar & Eisenberg (2017) found the same three factors as identified by Modecki et.al. (2017).

An important line of research has evolved on the increased risk for delinquent behavior among adolescents due to genetic influences rather than environmental factors. (Newsome & Sullivan, 2014) These authors found that the difference between vulnerable youths and the overall population could be attributed to genetic influences while the differences between resilient youth and the general population were primarily attributed to environmental factors. Newsome, Vaske, Gehring & Boisvert (2016) took this line of research further with an analysis of 1462 male and female adolescent twins and found that on average the females were more resilient to the cumulative risks of delinquency while males were more vulnerable. Girls seemed more receptive to environmental interventions as means of building resilience and overcoming risk factors.

Although there has been a considerable amount of published research over the years exploring the relationship of resilience to anti-social behavior, and we have a well-established framework linking resilience in adolescents to the reduction of risk related to engaging in delinquent behavior, there is considerably less research published which helps to identify how the field can go about promoting resilience in at-risk adolescents.

What research shows helps promote resilience in adolescents at risk of anti-social behavior:

Only two studies could be identified that specifically looked at what kinds of interventions could be provided to increase resilience in adolescents whohad been incarcerated because of delinquent activity or were at risk of anti-social behavior. Greenbaum & Javdani (2016), studied the effects of a targeted expressive writing program on 18 participants who completed the full intervention, out of an initial group of 53 in a large American city's short-term detention program. Results found significant increases in resilience scores for those who completed the writing intervention program compared to a parallel group who received a similar range of interventions (such as supportive group dynamics and regular contacts with a facilitator) but not the special expressive writing interventions. The experimental group had increases in resilience scores of .67 on a 5.0-point scale as compared to a decrease of .17 for those in the non-treatment group. The only difference in the interventions was the experimental group engaged in writing activities that promoted reflection and emotional self-expression.

A second study, (Parker, 2016) examined the effects of a therapeutic camp program on the resilience scores obtained from 123 adjudicated adolescent girls being treated in a three-month juvenile justice program aimed at behavior modification, improvement of study skills and the development of a passion for learning. The adolescents experienced a 12-week cycle of weeklong education and recreation modules that included: environmental science, technology, aerospace, food and nutrition, horticulture, health, marine science, electricity, zoology, physical science, high adventure and mechanical science. Their resilience scores were measured using the Resiliency Attitudes and Skills Profile (RASP), (Hurtes & Allen, 2001) upon entering the program and at exit. This study found a moderate

but significant improvement in the RASP scores associated with the length of time they stayed in the program. The study did not focus on what elements in the program produced those improvements.

Objective

This study aimed at taking the findings of Parker to the next level by attempting to identify if improvements in resilience are the result of specific identifiable interventions which can contribute to the empirically based practice (EBT) juvenile justice literature, (Mattox & Kilburn, 2013).

We hoped to find factors that would explain successful program completion, but approximately 80% of the participants were successfully terminated from the program. Because the majority of people successfully completed the program, we could not find any variable or combination of variables available to us that could explain successful or unsuccessful completion.

Methods

Study Design and Hypothesis

The study involved examining archived case records of young women at a therapeutic camp for adjudicated adolescents. These records were examined for 169 discrete quantitative and qualitative data items which could be used to explain the impact of different treatment intervention approaches on improving resilience.

The program measured resilience by using the 40 item Resiliency Attitudes and Skills Profile (RASP). Protocol calls for each camp participant to be given the RASP upon entry, and at exit. Each camp participant's record had up to four (4) intervention approaches specified. From these records, we could identify a total of 20 separate intervention approaches used by the program.

It was hypothesized that one or more of the intervention approaches should explain a change in RASP scores, and the Classification and Regression Trees (CART) approach was used to analyze the impact of the 20 treatment approaches on the change in pre-post RASP scores.

Participants

Staff not involved with the program extracted usable data from 218 case records of young ladies who entered the program from March 2014 through December 2016. There were 199 with sufficiently complete data for analysis. We eliminated program participants who were in the program for less than a week or who were medically discharged, and then we eliminated the 83 program participants with no RASP post-test scores[1] – leaving 114 records for initial analysis.

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[1] In cases of early termination, RASP post-test scores are not obtained.

Procedures

Possible RASP answers run from 1 – "Strongly Disagree", to 6 – "Strongly Agree", with identifying text on the two ends only. The exclusion of a "Don't Know" answer point, was intentional in order to "force a choice and ideally, to encourage respondents to identify their true feelings." (Hurtes and Allen, 2001, p338) However, in our data, where the respondent could not answer the question, she left it blank.

In order not to lose RASP change scores on 20 program participants who had left one or more answers blank, we coded those blanks using the most conservative score – '3.5' – the middle value, i.e., neither disagree nor agree.

Measures

RASP

As used in this program, RASP consists of 40 statements introduced by: "The following items relate to your opinions of yourself and your personal characteristics. Please read each statement and indicate the extent to which you agree or disagree with each one. There are no right or wrong answers, so please be as honest as possible!" (Parker, 2016, p. 102).

The dependent variable for this study is the change between the pre and post RASP scores. As shown in Table 1, the change in RASP scores varied widely, with a range of -38 to 145. A RASP change of -38 involves an average change of ~1 unit for each of the 40 items, which is credible. A score of 145 would indicate an average change of ~3.6 units for each of the 40 items, which is not credible; the teens were not taking either the pretest or post-test seriously. Consequently, we eliminated change scores greater than 1 standard deviation above the mean – leaving 102 cases for analysis.[2]

Table 1 – RASP Values – Pretest, Post-test and Change

	114 Cases		114 Cases	102 Cases
	Pretest	Post-test	RASP Change	RASP Change
Mean	195.0	212.5	17.5	10.7
Median	198.0	213.0	13.5	9.25
Std. Deviation	29.7	19.1	28.2	18.8
Minimum	77	149	-38	-38
Maximum	240	240	145	46
Skewness	-1.310	-0.695	1.382	-0.38
Std. Error of Skewness	0.226	.226	0.226	0.239
Kurtosis	.449	.449	4.308	-0.025

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[2] The change between the pre and post RASP tests is statistically significant – Related Samples Wilcoxon Signed Rank Test, Sig. = 0.000.

The smaller standard deviation in the post-test compared to the pretest, as well as the decrease in skewness indicates a substantially better distribution. For the 114 participants, as indicated by the skewness being more than twice the standard error of skewness, the distributions are not symmetric. As the skewness and kurtosis for the 102 participants indicate, the distribution is both relatively symmetric and normal.

Figures 1 and 2 show these results graphically. Figure 1 shows the distribution of RASP change of the 114 participants, while Figure 2 shows the distribution of RASP change after eliminating the extreme outliers – with 102 participants.

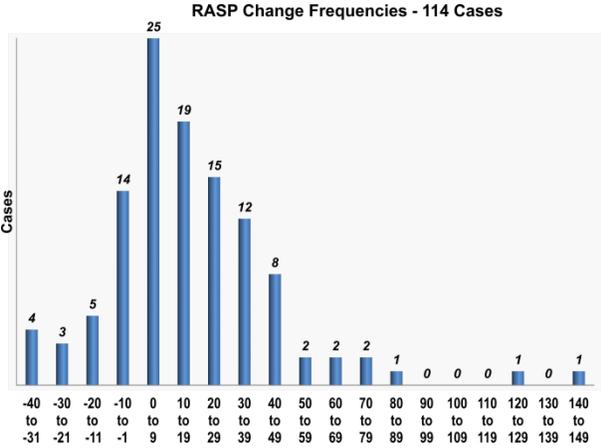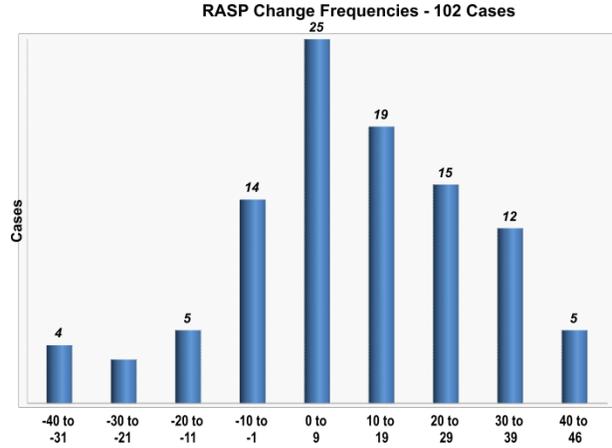Fig. 1 – RASP Change Frequencies – 114 participants

Fig. 2 – RASP Change Frequencies – 102 participants

Because of the small population size, we collapsed RASP change into three categories for analysis as shown in table 2.

Table 2 – RASP Change Coding

Category	RASP Change Range	Number in Category	Percent in Category
1	The lowest negative change (-38) to 0	26	25.5
2	1 to the mean (17)	40	39.2
3	18 to 1 standard deviation above the mean (46)	35	35.3

This coding lessens the impact of negative change, and eliminates indefensible positive average changes greater than ~1 per item.

Table 3 shows several background characteristics of the 102 participants, and Table 4 shows characteristics shared by at least 20% of these participants.[3]

Table 3 – Characteristics of the Program Participants

Characteristic	Measure
Number	102
Age range	12 - 18
Median age	16.0
Median days in program	76
Minority	53 %
One or more prior status offenses	68 %
One or more prior juvenile delinquent offenses	46 %
One or more prior violent crime offenses	34 %

Table 4 – Characteristics Shared by 20% Or More

Characteristic	Percentage	Characteristic	Percentage
Alcohol/Drug Abuse	48	Father has a criminal record	28
Mother works	44	Mother has a criminal record	26
Problems at school	43	Aggressive (Verbally)	24
Truancy	41	Family history of criminal activity	24
Aggressive (Physical)	37	Difficulty with authority	23
Running away	37	Oppositional/Defiant	22
Father works	32	Steals	21
Good personal hygiene	29	Family history of psychiatric illness	21

Interventions

As noted above, we categorized all interventions listed in the case records into 20 discrete categories. Table 5 shows the specific intervention and number receiving that intervention for the 102 cases in the analysis.

Table 5 – Intervention Categories

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[3] All data are from case records from the program and the state juvenile justice assessment centers. As such, given the sometimes fluid nature of these cases, data may be incomplete. These best data available are used in this analysis.

Intervention	N	Intervention	N
Confront consistent non-compliant behavior	57	Develop self esteem	11
Anger management	50	Accepting responsibility for action	8
Drug alcohol counseling	38	Learn to deal with negative peers - gangs	8
Education	24	Learn coping skills	7
Comply with Camp Rules	20	Improve decision making	7
Conflict resolution skills	19	Other	4
Individual counseling	16	Appropriately deal with sexual activity	2
Build social skills - communication	15	Dealing with loss	1
Family counseling	11	Vocational - Job Skills	0
Process daily thoughts	11	Learning how to handle anxiety	0

As a number of these interventions associate with each other, e.g., the three 'counseling' interventions, including one in analysis would preclude the others from the analysis. Therefore, we used Factor Analysis on the interventions given to more than 10% of the clients as a guide in developing the 'Intervention Categories' shown in Table 6.

Table 6 – Constructed Intervention Categories

Intervention Category	Interventions Included	Number Receiving
Manage Conflict	Anger management Conflict resolution skills	52
Dealing with Expectations	Confront consistent non-compliant behavior Process daily thoughts	58
Counseling	Family counseling Individual counseling Drug / Alcohol counseling	45

The independent variables used in the analysis included the three 'Intervention Categories' – with the category values indicating the number of different interventions provided in each category; 0, 1, 2 (or 3). The separate interventions of "Education", "Develop Self Esteem", "Comply with Camp Rules" were also included.

Statistical Analysis

We used 'Classification and Regression Trees' (CART) – an "algorithmic approach" for Decision Tree Analysis (DTA) – for analysis of these data. CART "is a relatively new form of data analysis that is 'computer-assisted' and based on 'machine learning.' It has been formally developed over the past three decades" (McArdle, 2014, p 8) DTA is increasingly used in a variety of settings. (See especially, McArdle and Ritschard, 2014) One famous example used CART to reduce SPAM in email. (Hastie, Tibshirani and Friedman, 2009).

Loh elegantly defines the approach: "Classification and regression trees are machine-learning methods for constructing prediction models from data. The models are obtained by recursively partitioning the data space and fitting a simple prediction model within each partition. As a result, the partitioning can be represented graphically as a decision tree" (Loh, Wei-Yin., 2011).

CART has features which work well with the data we have available and offers many advantages. As McCardle summarizes, DTA is most helpful "especially in the typical situation when we have little a priori information and are not sure what to do next. It is clear that DTA is most useful when there are many predictors and we do not know which ones to consider first. But, DTA is most useful when there are nonlinearities or many possible interactions and we really do not know which ones are the most crucial" (2014, p. 37). Additionally, "1. CART is nonparametric and does not require specification of a data distribution. 2. The final modeling variables are not selected beforehand but selected automatically by the algorithm" (Nisbit, 2009, p. 144).

As the dependent variable of this study is categorical, our analysis generates 'classification trees.' Given the small population size, in order to obtain the most stable set of trees we used a minimum parent size of 26 (>1/4 the total cases) and a minimum child size of 5 and '10 fold cross-validation.' "The cross-validation provides a number of independent estimates of the error associated with the algorithm itself rather than due to the randomness in the data. A model created with CART . . . should not be accepted until the prediction error is partitioned in this manner." (Nisbet, 2009, p. 144) We also used 'Twoing' to find the best splits in the data. Wu, et.al, note, "In our experience the twoing criterion is often a superior performer on multi-class targets as well as on inherently difficult-to-predict (e.g. noisy) binary targets." (2007, p 29).

Results/Findings

Even with the small population and limitations of the RASP data as noted above, CART was able to find useful data to guide practice. As shown in the Table 2 above – and Figure 3 below – the distribution of the Coded RASP Change scores is relatively equivalent, i.e., ~25% to ~35%. The explanatory power of the resulting model is small but significant. The optimal tree is shown in Figure 3. There are three levels of splits; the small population size limits the number of levels.

It should be noted that CART is quite sensitive to data changes. It is possible to develop better models using arbitrary splits in the dependent variable – RASP Change. Given the inherent questions about the timing of the administration of the pre and post RASP tests, we felt it best to stay with this tri-fold split based upon the mean and standard deviation as noted above.

Fig. 3 – CART tree results showing the impact of 'Dealing with Expectations,' 'Managing Conflict' and 'Counseling' intervention categories on RASP change
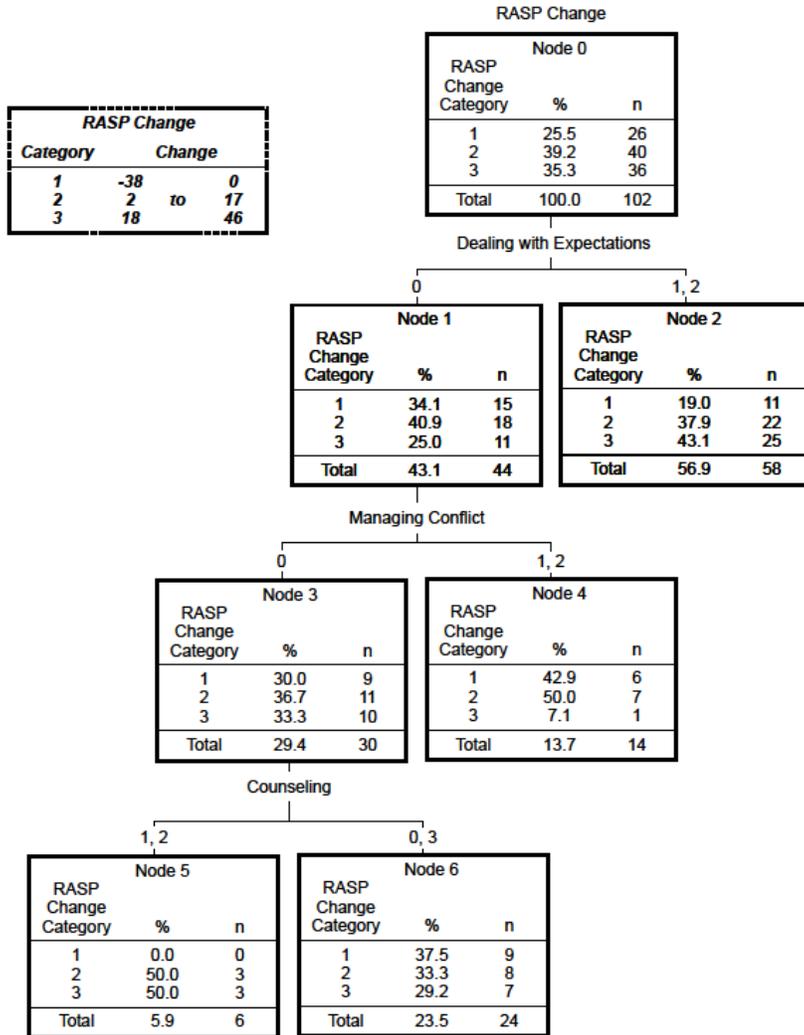
The model has the best explanation of Category 3 – change of 18 to 46 points, so the explanation will concentrate on that category.

The first split found by CART was 'Dealing with Expectations.' The split of Coded RASP Change on this category is between those people who did not have any of the interventions in this intervention category vs. those who had one or both of the interventions. For those in Node 2 – those who had one or both interventions – the improvement in RASP scores is dramatic. Specifically, of those whose RASP scores changed the most, approximately 70% or ~2.3 times as many, had one or both of these interventions compared to those who had none. This means that those in that category who were provided one or more of the interventions in 'Dealing with Expectations' (which were 'Confront consistent non-compliant behavior' or "Process daily thoughts') experienced a substantially higher change than those who were not provided those interventions.

The second split CART found was 'Managing Conflict' – for those who had no 'Dealing with Expectations' interventions. The RASP Change split is again between those people who did not have any of the interventions in this intervention category vs. those who had one or both of the interventions. For these people, there is only an insignificant value for those in Category 3 in having one or both of the included interventions. The improvement is mainly in RASP Change Categories 1 and 2.

The third split CART found was 'Counseling' – for those who had none of the preceding interventions. The RASP Change split is not as straightforward as were the other two splits. In this case, the distinction is between those who had 1 or 2 of the interventions, vs. those who had none or all 3. Although there is improvement in RASP scores for these interventions, for Category 3, the most influential is having none or all 3 interventions in this Intervention Category. Note that all the Category 1 RASP Change people received 0 or 3 interventions.

Overall, the Model only predicts 33.3% correctly (Cross-Validation Risk = .667). However, as shown in Table 7, the model is somewhat better at predicting on the 0 category and quite good on the 3 category – 77.8% correctly predicted.

Table 7 – Classification Summary

Observed Category	Predicted Category			
	1	2	3	Percent Correct
1 (-38 to 0)	9	6	11	34.6%
2 (2 to 17)	8	7	25	17.5%
3 (18 to 46)	7	1	28	77.8%
Overall Percentages	23.5%	13.7%	62.7%	43.1%

Continuing to focus upon Category 3, the greatest level of RASP Change (change score between 18 and 46), we could predict with reasonable accuracy that to obtain this level of RASP Change, clients should be given one or more of the interventions 'Confront consistent non-compliant behavior' and 'Process daily thoughts.' For those who did not receive any of these interventions, they need not be given 'Anger management' or 'Conflict resolution skills' interventions, but should be given any of the three 'Family', 'Individual' and 'Drug/Alcohol counseling' interventions – with the most impact coming from 0 or all three.

Discussion

One objective of this research was to find if these real-world treatment approaches could be used to impact resilience. The answer is, "Yes, they can."

The findings of this research identified three sets of interventions comprised of seven separate treatment interventions that had a significant positive impact on the building of resilience in adjudicated adolescent females. The first set we labeled "dealing with expectations" and was comprised of "being confronted with consistent non-compliant behavior" and "processing daily thoughts." The second we labeled "managing conflict" and included "learning anger management techniques" and "developing conflict resolution skills." The third set we labeled "counseling" and included "individual counseling," "family counseling," and "drug and alcohol counseling."

The intervention of "confronting consistent non-compliant behavior" includes a number of techniques aimed at modifying behavior. A point and level system is used and staff attempt to "redirect" negative behavior when it is observed. If a youth gets "written up" it can result in additional time in the program. Negative behavior can also result in meeting with a counselor or one of the management staff of the program. If the behavior is serious enough, such as fighting, it can result in calling in the youth's probation officer who is involved in any decision to hold the youth in the program longer. Both the direct care staff (field instructors) supported by the counseling staff will engage a youth exhibiting non-compliant behavior to review behavioral options and explore with the youth the potential results of those options under review.

Another intervention in this set is "process daily thoughts" and this happens in a couple of ways. One is the use of "journaling" and as we have noted, the benefit of this technique is supported by research with juvenile justice involved youth (Greenbaum et al., 2016). The second way is the use of "girl's circles" which involves group processing using all youth assigned to the same residential unit and enables staff to foster peer guidance related to behavior and the implications of options chosen.

The second set of interventions identified as effective is "managing conflict." This intervention involves the development of anger management techniques (inwardly focused) and the development of conflict resolution skills (outwardly focused). The youth in care may be assigned to an "anger management group" where she would learn more about what angers her and identify the "triggers" that set off her angry responses. This may be done with the whole residential unit which can provide ongoing support to help a youth recognize a confrontational situation that is likely to "set her off."

The "flip side" of anger management is the development of "conflict management skills." The youth who is learning to recognize what triggers anger within her will be provided information on conflict resolution steps that can be used to de-escalate a conflict situation. They may work in dyads to help each other learn how to operationalize these de-escalation approaches. In addition, all the youth will be involved in "team building" activities such as using the "high ropes course" and at least one outdoor sport. They will also be given the opportunity to process how skills learned during team building activities can help them better manage potential conflict situations in both the unit and their home community.

The final set of interventions involved a range of counseling approaches. All the youth are assigned an individual counselor with whom she may meet two to three times a week for an hour. These meetings provide the opportunity to help the youth review her interactions with other youth, family, school and community individuals and groups and process how she can develop ways to make these interactions work for her growth and success. If the youth has an issue with substance abuse, there will be counseling specifically aimed at helping the girl develop mastery over the abuse. The stage of recovery will be explored as well as what in her life led her to become a substance abuser and what needs to be done to promote recovery and prevent relapse.

If the youth has a parent or parents who are willing to participate, family counseling will be provided. To date, only about 10% or less of those in care have families that have been willing to be involved. Given what is known about family dynamics and delinquent behavior (See Johnson, Hawes, Eisenberg, Kohlhoff, & Dudeney,

2017 and Mincey, Maldonado, Lacey, & Thompson, 2008) this area could benefit from determining how the participation rate could be improved.

Limitations and Implications for Future Research

Given the size of the program the total number of subjects used in the study was not as large as one might like. We started out with 218 usable records but of those only 102 had the credible RASP pretest and posttest scores needed to compute the change in resilience scores. This was often caused by the fact that post RASP testing was not available from those girls who terminated prematurely. As a result, we have no way of knowing if these participants had significantly smaller improvement in their overall resilience scores. We would suggest that in cases where a therapeutic program participant is being terminated prematurely that some attempt be made to assess their resilience scores at that point in time.

Since the results of those who successfully finished the program identified a number of interventions that showed significant impact on resilience improvement, it would be beneficial to continue to collect this data over a longer period of time with the goal of greatly increasing the total number of participants studied in order to replicate this research with a more comfortable number of participants.

A second area for consideration is one that was first identified by Shaunette Parker (2016) in her initial study of this population and program. The concern identified was the risk of collecting the RASP data either too early in the treatment process or too close to when the girl was going to be discharged. It is recommended that the data collection process be moved to a point after the participant has "settled in to the program" and again some time prior to her leaving, with the aim of not having the immediacy of the trauma of placement or discharge negatively impact the collection of resilience data.

We were encouraged by the results of this study and would encourage other programs to adopt the interventions we found effective. We hope others will replicated this type of study to aid in building the repertoire of techniques that are found effective in producing results that limit the risk of recurring juvenile offences.

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