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The Relationship Between Cognitive Reappraisal and Depression During Middle Childhood

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Abstract

Cognitive reappraisal is associated with fewer depressive symptoms in adult and adolescent populations. Few studies have investigated the relationship between cognitive reappraisal and depression during middle childhood. The current study seeks to fill this gap in the literature. 76 participants ages 9-13 participated in a longitudinal study on preschool-onset depression. Data was gathered on participants' cognitive reappraisal use and number of core depressive symptoms at each age. Greater cognitive reappraisal uses at ages 9-13 was associated with fewer concurrent depressive symptoms. Children who had *never* experienced a depressive episode were 1.278 times more likely to use cognitive reappraisal than children who were in a *current* depressive episode (OR = 1.278, p = .064). Cognitive reappraisal at ages 9-13 did not predict depressive symptoms from ages 14-19. Cognitive reappraisal could prove to be an effective strategy for alleviating depressive symptoms in middle childhood. However, further research is needed to parse out the short-term and long-term nuances of this relationship.

Key Words:

Childhood-onset depression, cognitive reappraisal, middle childhood, emotion regulation strategies

Depression is a widespread disorder detrimental at both an individual and societal level. In 2010, Major Depressive Disorder (MDD) was the 11th leading source of global disease burden, and the greatest cause of disease burden among the mental and behavioral disorders (Murray, et al., 2012). The literature has found a wide range of harmful effects caused by MDD in adults and adolescents, including greater social rejection, less access to peer groups, impairments in building friendships and preparing for a future career, difficulty with body acceptance, and deficits in the development of a personal identity, a value system, and socially responsible behavior (Pinquart & Pfeiffer, 2018; Segrin & Dillard, 1992).

Childhood-Onset Depression

Mental health disorders can manifest at a very young age. Among all U.S. children aged 2–8 years in 2016, 17.4% were diagnosed with a mental, behavioral, or developmental disorder (Cree, et al., 2016). Depression in children is also highly comorbid with other mental disorders- out of all the children aged 6-17 in the US, almost 3 out of 4 are also diagnosed with anxiety (Ghandour, 2018). Untreated childhood depression can also contribute to depression later in childhood and during adulthood, since each depressive episode makes successive depressive episodes more likely (Kendler et al., 2001; Luby et al., 2014). Additionally, childhood depression is especially dangerous because it occurs during a critical time of development and can permanently harm personal functioning, personality, and ability to

maintain relationships (National Collaborating Centre for Mental Health, 2005).

Emotion regulation is a crucial aspect of childhood depression, just as it is in adult depression. Emotion regulation can be defined as the process of influencing one's own emotional experience and emotional expression at a certain moment (Dryman et al., 2018). For example, if someone is feeling sad because they lost a competition, they might decide to think about something that usually makes them happy, such as a beloved pet, which would alter their experience of their current emotion. During adolescence and childhood, there is a positive relationship between use of maladaptive emotion regulation strategies and the presence of both internalizing and externalizing disorders, including depression. (Compas et al., 2017). Emotion regulation has been extensively tied to depression prevalence rates and outcomes in the literature.

Cognitive Reappraisal

Cognitive reappraisal is a specific emotion regulation strategy that has a nuanced relationship with depression. The strategy relies on thinking about an event differently in order to change one's emotions in response to the event. For example, one might feel sad about losing a competition, but then reappraise the situation by telling themselves that this is actually a positive result because it will motivate them to work harder for the next competition. This will likely regulate their emotional experience by producing a positive valence emotion.

Depressed groups use cognitive reappraisal less often than non-depressed groups in daily life, which indicates that cognitive reappraisal has an underlying relationship with depressive symptoms (Betts, Gullone, & Allen, 2009; Chambers et al., 2015; Garnefski & Kraaij, 2006; Garnefski et al., 2002; Joorman, 2010). However, the relationship between cognitive reappraisal and depression has not been explored as thoroughly as other emotion regulation strategies, such as rumination and suppression, and is sometimes shown to have a weaker relationship with depression than these other emotion regulation strategies (Aldao et al., 2010; Garnefski et al., 2007). The relationship between cognitive reappraisal and depression requires further research, particularly to address certain aspects of the relationship that are distinctive from other emotion regulation strategies.

One of the unique differences found in the relationship between cognitive reappraisal and depression is the difference between frequency of use and actual ability to use the strategy. Depressed groups report using cognitive reappraisal less frequently than control groups in their daily lives (Dryman et al., 2018). However, when asked to use cognitive reappraisal during in-lab tasks, there is no significant difference between the effectiveness of the strategy between depressed and control groups (Ehring et al., 2010; Ellis et al., 2013; Millgram et al., 2015; Smoski et al., 2014). Depressed participants are able to use cognitive reappraisal to change their emotions as effectively as non-depressed participants, but for some reason, do not use the strategy as frequently. Therefore, researching the differing frequency of cognitive reappraisal use between depressed and non-depressed groups could significantly benefit our understanding of the underlying mechanisms behind depressive symptoms.

Additionally, the negative relationship found between cognitive reappraisal use and depressive symptomatology is potentially unique to people experiencing current Major Depressive Episodes (MDE). People who are remitted from depression are often shown to use cognitive reappraisal just as frequently as control groups who have never experienced an MDE (Ehring et al., 2008; Ehring et al., 2010); or, at the very least, remitted groups use cognitive reappraisal more often than currently depressed groups (D'Avanzato et al., 2013; LeMoult & Gotlib, 2019). This indicates that the reduced use of cognitive reappraisal might only occur in currently depressed groups.

The link between cognitive reappraisal use and depression could potentially identify cognitive reappraisal as a protective factor against depressive symptoms. In adults, more frequent use of cognitive reappraisal at one time point often correlates with higher remission rates or less severe depressive symptoms at a later time point (Garnefski & Kraaij, 2007). In both adults and adolescents, those who use cognitive reappraisal more frequently are less likely to concurrently have depression (Betts et al., 2009).

Cognitive Reappraisal during Childhood

As with many areas of research, there is much less research on depression in child populations than adult populations. However, children as young as preschool-aged can develop depression, and depression at that early age is highly continuous through school-age (Luby et al., 2014). As with adults, there is evidence that children who are at-risk for depression are less likely to develop depression if they use cognitive reappraisal more frequently (Kudinova et al., 2018). Implementing the frequent use of cognitive reappraisal at a young age could potentially be used as a preventative measure against the development of depressive symptoms.

However, more converging research on the effects of cognitive reappraisal in children is necessary before cognitive reappraisal can be used as a strategy for preventative care. The literature contains conflicting results concerning the possibility of cognitive reappraisal being a protective factor for depression. In some cases, it seems that frequent cognitive reappraisal use does not have a significant relationship with future depressive symptoms (Arditte & Joorman, 2011). It should be noted that there are few longitudinal studies in the literature examining cognitive reappraisal and depression specifically (Compas et al. 2017). In the studies mentioned previously, which measured cognitive reappraisal and depressive symptomatology at two time points, there was, at most, a one-year gap between time 1 and time 2. There are few studies which examine long-term relationships between cognitive reappraisal and depression.

The Present Research

To the best of the author's knowledge, there are currently no studies examining the relationship between depression and cognitive reappraisal during middle childhood using a longitudinal design. Cognitive reappraisal and depression in adolescents generally have the same negative relationship that is found in adults (Compas et al. 2017; Garnefski & Kraaij, 2006). However, pre-teens and young children show patterns that conflict with those found in adults and adolescents, sometimes even showing a positive relationship between cognitive reappraisal use and depressive symptoms (Compas et al. 2017). The current study seeks to fill in this gap in the literature for the relationship between cognitive reappraisal and middle-childhood depression. Expanding our knowledge about the relationship between cognitive reappraisal and depression during middle childhood could potentially improve the way that we treat and prevent depression starting from childhood.

We hypothesize that the more often 9-11-year-olds use cognitive reappraisal, the weaker their depressive symptoms will be at ages 9-11; currently depressed 9-11-year-olds will use cognitive reappraisal less often than both remitted and never-depressed 9-11-year-olds. Additionally, cognitive reappraisal is predicted to be a protective factor against depressive symptoms during and after childhood, such that the more often 9-11-year-olds use cognitive reappraisal, the weaker their depressive symptoms will be when they reach adulthood (ages 18-20).

Methods

Overall Study Design

Participants were enrolled in the 17-year longitudinal Preschool Depression Study that started in 2003. Assessments are ongoing at the Early Emotional Development Program at the Washington University in St. Louis School of Medicine. Participants were recruited between the ages of 3 years and 5 years 11 months from pediatricians' offices, daycare centers, and preschools in the greater St Louis metropolitan area using the Preschool Feelings Checklist (PFC). At baseline, 306 caregiver-child dyads were enrolled in the study (for more details, see Luby et al., 2009). During baseline and up to 9 follow-up assessment between 2003 and 2020, participants completed a wide array of assessments that measured diagnostic symptoms, neurological markers, cognitive and emotion regulation abilities, behavioral parent-child interaction data, family history of clinical disorders, and more (see Gaffrey et al., 2018; Lopez et al., 2018).

Participants

Participants in a longitudinal study completed self-report questionnaires about their own cognitive reappraisal use and participated in semi-structured interviews that evaluated the frequency and intensity of their depressive symptoms. They completed these

measures when they were 9-13 years old, and then again at 18-20 years old. The study oversampled for children with or at-risk for depression and included children with other clinical disorders and clinically healthy children as comparison groups (see Luby et al., 2009). All study procedures were approved by the Washington University School of Medicine institutional review board.

Measures

CAPA. The Child and Adolescent Psychiatric Assessment is a semi-structured interview for children and their caregivers used to diagnose a wide variety of clinical disorders in children ages 9-17. The CAPA evaluated participants' depressive symptoms during all waves from T6 through T14.

KSADS. The Kiddie Schedule for Affective Disorders and Schizophrenia is a semi-structured interview for children and their caregivers to diagnose past and present symptoms of a wide variety of clinical disorders in children ages 6-18. The KSADS was used to assess participants' depressive symptoms during T18 and T20.

CERQ-k. The Cognitive Emotion Regulation Questionnaire for Kids is a self-report questionnaire for children ages 9-11 that measures the frequency of use of nine different cognitive emotion regulation strategies, including cognitive reappraisal. The CERQ-k was adjusted from the CERQ to use more age-appropriate language and has been validated for use with children ages 9-11 (Garnefski et al., 2007). Each item is assessed with four items, making up 36 items total in the questionnaire. Participants are asked to rate statements such as "when something bad happens I think that there are good sides to it as well" on a 5-point Likert scale. Participants completed either the CERQ or the CERQ-k during all waves from T8 through T20 depending on their age at the time of each assessment.

Results

Descriptive Statistics

Descriptive statistics are presented in Table 1. There were 158 males and 148 female participants at baseline. Ages ranged from 8-12 years old at T8 to 14-19 years old at T18. Cognitive reappraisal scores ranged from 4 to 20 at T8 to 5 to 20 at T18 out of a total score of 20. MDD symptoms ranged from 0-9 at T8 to 0-9 at T18 out of a total score of 9.

Table 1. *Descriptive statistics of participants in waves T8, T10, T14 and T18*

Variable	N	*M*	*SD*	*Min*	*Max*
Child Sex	306	158 males	--	--	--
T8 Age	261	10.17	.898	8.32	12.54
T10 Age	235	11.16	.878	9.31	13.51
T14 Age	66	13.57	.959	11.50	15.74
T18 Age	139	16.43	.998	14.05	19.35
T8 Positive Reappraisal	74	11.55	3.477	4	20
T10 Reappraisal	76	12.30	3.111	5	20
T18 Reappraisal	138	13.21	4.039	5	20
T8 MDD symptom severity	261	2.83	2.091	0	9
T10 MDD symptom severity	235	2.62	2.071	0	9
T18 MDD symptom severity	139	1.68	2.503	0	9

Hypothesis 1

We predicted that greater cognitive reappraisal use would be associated with fewer depressive symptoms. A Pearson correlation was run to determine the relationship between cognitive reappraisal and number of core MDD symptoms in children at T8 and T10. There was a negative correlation between cognitive reappraisal and MDD symptom severity at T10 (r = -.340, n = 73, p = .003) such that children with higher cognitive reappraisal scores exhibited fewer MDD symptoms. However, this same relationship was not statistically significant for children at T8 (r = -.063, n = 72, p = .599).

Hypothesis 2

We predicted that children experiencing a depressive episode from ages 9-11 would use less cognitive reappraisal than children with remitted depression or never depressed children. A multinomial logistic regression was run to determine whether there is a difference between cognitive reappraisal use in children at T10 who are experiencing a *current* MDE compared to children at T10 who are *remitted* from depression, and compared to children at T10 who have *never* experienced an MDE. At T10, there was no difference in cognitive reappraisal use for children in a *current* depressive episode compared to children with a past depressive episode (*remitted*) (OR=1.17, p=0.256). However, there was a marginally significant relationship comparing children who have never experienced an MDE with children who were in a current MDE. Children who have *never* experienced an MDE were 1.278 times more likely to use positive reappraisal than children who are in a *current* MDE (OR = 1.278, p = .064) (Table 2).

Similarly, at T10 there was also no difference in positive reappraisal use for children *remitted* from depression compared to children who had *never* experienced an MDE (OR=.912, p=.341) (Table 3).

Table 2. *Logistic Regression Analyses Examining Differences in Positive Reappraisal Use at T10 (Reference category: Current)*

						95% CI for OR	
	B	SE	Wald	*df*	*p*	OR	Lower	Upper
Never Depressed								
Positive Reappraisal	.246	.132	3.442	1	.064	1.278	.986	1.657
Age	-.530	.445	1.421	1	.233	.588	.246	1.407
Past Major Depressive Episode								
Positive Reappraisal	.153	.135	1.290	1	.256	1.165	.895	1.158
Age	-.187	.457	.168	1	.682	.829	.339	2.030

Table 3: *Logistic Regression Analyses Examining Differences in Positive Reappraisal Use at T10 (Reference category: Never)*

						95% CI for OR	

		B	SE	Wald	*df*	*p*	OR	Lower	Upper
Past Major Depressive Episode									
	Positive Reappraisal	-.093	.097	.908	1	.341	.912	.754	1.103
	Age	.343	.346	.985	1	.321	1.409	.716	2.774
Current Major Depressive Episode									
	Positive Reappraisal	-.246	.132	3.442	1	.064	.782	.603	1.014
	Age	.530	.445	1.421	1	.233	1.700	.711	4.065

A multinomial logistic regression was run to determine whether there was a difference between positive cognitive reappraisal use in children at T8 who are experiencing a *current* MDE compared to children at T8 who are *remitted* from depression, and compared to children at T8 who have *never* experienced an MDE. At T8, there was no difference in cognitive reappraisal use for children in a *current* depressive episode compared to children who have *never* experienced a depressive episode (OR = 1.11, p = .266). At T8, there was also no difference in cognitive reappraisal use for children in a *current* depressive episode compared to children *remitted* from depression (OR = .973, p = .787) (Table 4). Similarly, at T8 there was also no difference in cognitive reappraisal use for children *remitted* from depression compared to children who had *never* experienced an MDE (OR = .877, p = .152) (Table 5). Additional Pearson correlations were run to determine the relationship between positive reappraisal and number of core MDD symptoms in children at T10 for the three depression diagnosis groups of children (*current, remitted, never*). Within the group of children who had *never* experienced an MDE, there was a negative correlation between positive reappraisal and MDD severity at T10 (r = -.387, n = 37, p = .018), indicating that less positive reappraisal use was associated with more depressive symptoms. However, within the group of children who were in a *current* MDE, the relationship between positive reappraisal and MDD severity at T10 (r = -.029, n = 12, p = .928) was not statistically significant. It should be noted that the n of this analysis is quite small and may have reduced our power to detect significant effects. Similarly, within the group of children *remitted* from depression, there was not a statistically significant relationship between positive reappraisal and MDD severity at T10 (r = -.139, n = 23, p = .528).

Table 4: *Logistic Regression Analyses Examining Differences in Positive Reappraisal Use at T8 (Reference category: Current)*

							95% CI for OR	
		B	SE	Wald	*df*	*p*	OR	Lower	Upper
Never Depressed									
	Positive Reappraisal	.104	.094	1.235	1	.266	1.110	.924	1.333
	Age	-.901	.359	6.293	1	.012	.406	.201	.821
Past Major Depressive Episode									
	Positive Reappraisal	-.028	.103	.073	1	.787	.973	.795	1.189
	Age	-.453	.398	1.296	1	.255	.636	.292	1.387

Table 5: *Logistic Regression Analyses Examining Differences in Positive Reappraisal Use at T8 (Reference category: Never)*

							95% CI for OR	
		B	SE	Wald	*df*	*p*	OR	Lower	Upper
Past Major Depressive Episode									
	Positive Reappraisal	-.132	.092	2.047	1	.152	.877	.732	1.050
	Age	.449	.355	1.601	1	.206	1.566	.782	3.138
Current Major Depressive Episode									
	Positive Reappraisal	-.104	.094	1.235	1	.266	.901	.750	1.083
	Age	.901	.359	6.293	1	.012	2.463	1.218	4.981

Hypothesis 3

We predicted that the use of positive reappraisal at T10 would lead to fewer depressive symptoms in early adulthood (T18). A Pearson correlation was conducted to determine the relationship between positive reappraisal at T10 and number of core MDD symptoms at T18. The relationship between positive reappraisal at T10 and depressive symptoms at T18 was not statistically significant (r = -.094, n = 64, p = .458).

A linear regression was also run to determine the relationship between positive reappraisal at T8 and number of MDD symptoms at T18 (Table 6), controlling for children's age and sex. The overall model fit was not statistically significant ($F_{(3,57)}$ = 2.122, p = .107), with an R^2 of .100, indicating that

these variables explained little variance in T18 depressive symptoms. There was no relationship between child sex (B= 1.326, *p*=.044) or age (B= .330, *p*=.351) and T18 depressive symptoms. Further, T10 positive reappraisal did not predict T18 depressive symptoms (B= .114, *p*=.217). Participants' predicted core MDD symptoms at T18 is equal to -4.951 + .114 (positive reappraisal at T8) symptoms when positive reappraisal is measured on a 5-point Likert scale with four items. Participant's depressive symptoms at T18 increase .114 for each point of positive reappraisal.

A linear regression was also run to determine the relationship between positive reappraisal at T10 and number of MDD symptoms at T18 (Table 7), controlling for children's age and sex. The overall model fit was not statistically significant ($F_{(3,57)}$ = 1.287, p = .287), with an R^2 of .063, indicating that these variables explained little of the variance in depressive symptoms at T18. There was no relationship between child sex (B= 1.07, *p*=.119) or age (B= .546, *p*=.192) and T18 depressive symptoms. Further, T10 positive reappraisal did not predict T18 depressive symptoms (B= .070, *p*=.570). Participants' predicted core MDD symptoms at T18 is equal to -6.569 + .070 (positive reappraisal at T10) symptoms when positive reappraisal is measured on a 5-point Likert scale with 4 items. Participant's depressive symptoms at T18 increase .070 for each point of positive reappraisal

Table 6: *Positive Reappraisal at T8 as Predictor of Depressive Symptoms at T18*

Predictor	B	95% CI	ß	t	p
Constant	-4.951	-12.575 to 2.673	---	-1.300	.199
Sex	1.326	.038 to 2.614	.262	2.061	.044
Age	.330	-.373 to 1.032	.120	.940	.351
Positive Reappraisal	.114	-.069 to .296	.158	1.247	.217

Table 7: *Positive Reappraisal at T10 as Predictor of Depressive Symptoms at T18*

Predictor	B	95% CI	ß	t	p
Constant	-6.569	-17.343 to 4.206	---	-1.221	.227
Sex	1.070	-.283 to 2.424	.205	1.583	.119
Age	.546	-.282 to 1.374	.175	1.321	.192
Positive Reappraisal	.070	-.176 to .316	.075	.571	.570

Exploratory Analyses

A Pearson correlation was also run to determine the relationship between positive reappraisal at T18 and depressive symptoms at T18. The relationship between positive reappraisal at T18 and depressive symptoms at T18 was marginally significant (r = -.161, n = 138, p = .060). This pattern is similar to the relationship found in the same variables during T10. Although positive reappraisal at T10 does not predict depressive symptoms at T18, there is a negative relationship between positive reappraisal and depressive symptoms both at T10 and T18.

Additional linear regressions were also run to determine the relationship between positive reappraisal at T8 and 18, at T10 and T18, at T10 and T14, and at T14 and T18. There was no relationship between positive reappraisal at T8 and positive reappraisal at T18 (B=.167, p=.205). There was also no relationship between positive reappraisal at T10 and positive reappraisal at T18 (B=.242, p=.144). However, there were significant relationships between positive reappraisal at T10 and positive reappraisal at T14 (B=.461, p=.002), and positive reappraisal at T14 and positive reappraisal at T18 (B=.380, p=.000).

More frequent use of cognitive reappraisal during middle childhood did not predict more frequent use of cognitive reappraisal at T18. However, more frequent use of cognitive reappraisal during middle childhood predicted greater use during adolescence, and more frequent use of cognitive reappraisal during adolescence predicted greater use of cognitive reappraisal in early adulthood.

Discussion

Adaptive emotion regulation strategies are vital in reducing the frequency and intensity of depressive symptoms. Cognitive reappraisal is one adaptive strategy that, in adults, has a negative relationship with depressive symptoms. However, there have been few cognitive reappraisal studies conducted with children in middle childhood. The current study examined the relationship between depressive symptoms and cognitive reappraisal in middle childhood and evaluated the possibility of cognitive reappraisal as a predictor for future depressive symptoms.

More frequent use of cognitive reappraisal did indeed correlate with fewer core depressive symptoms in children 9-13 years old. This is a unique finding in the literature because few studies on cognitive reappraisal have examined this specific age group. Even the paper which validated the CERQ-k questionnaire as a way to measure cognitive reappraisal in 9–13-year-olds did not find a statistically significant relationship between depressive symptoms and the specific strategy of cognitive reappraisal (Garnefski et al., 2007). This provides evidence that cognitive reappraisal could be a productive avenue of research in reducing depressive symptoms, even in children as young as nine years old.

There is, of course, a question of directionality in this relationship between depressive symptoms and cognitive reappraisal. The CERQ-k simply asks children to rate how frequently they use cognitive reappraisal in their daily lives, which yields correlational data. Potentially, more frequent use of cognitive reappraisal could partially alleviate the severity of depressive symptoms. However, the negative relationship could also mean that those with more depressive symptoms are less likely to think to use cognitive reappraisal as an emotion regulation strategy, whether consciously or subconsciously. It is likely that both effects occur at the same time. In adult and adolescent populations, individuals with depression report less frequent use of cognitive reappraisal in their daily lives. But when they are instructed to use it to regulate an emotion in a lab setting, they are able to implement the strategy with the same effectiveness as clinically healthy participants (Ehring et al., 2010; Ellis et al., 2013; Millgram et al., 2015; Smoski et al., 2014). In future research, replications of these experimental manipulations in 9-13-year-old populations will be necessary to evaluate their ability to use cognitive reappraisal.

In the current literature, there are also differences in cognitive reappraisal use depending on depression diagnosis status in adults. Individuals experiencing current depressive episodes use cognitive reappraisal less often than both individuals remitted from depression and individuals who have never experienced a depressive episode (D'Avanzato et al., 2013; Ehring et al., 2008). We hypothesized that the same result would be found in children ages 9-13. Cognitive reappraisal use did not differ between 9- and 13-year-olds who were experiencing a current depressive episode and those who were remitted from depression. However, children who have *never* experienced an MDE were 1.278 times more likely to use positive reappraisal than children who are in a *current* MDE. However, this finding was only marginally significant. It is possible that the current study simply did not have enough power to find any strong group differences. Originally, the sample size of the group included 74 participants. When the sample was split into the three different depression

diagnosis groups, the size of each group was greatly reduced: currently depressed (*n*=37), remitted (*n*=23), never depressed (*n*=37). The same procedure should be replicated with a greater sample size to determine whether there are differences in cognitive reappraisal use between 9-13-year-olds in the three depression diagnosis groups.

An important aspect of cognitive reappraisal use is its potential as a protective factor against future depressive symptoms. There are few studies in the current literature examining cognitive reappraisal in a longitudinal design, even in adults. We predicted that more frequent use of cognitive reappraisal in middle childhood would correlate with fewer core depressive symptoms in early adulthood. However, there was no significant relationship between cognitive reappraisal at ages 9-13 and depressive symptoms at ages 16-19. Exploratory analyses with data from other time points in the larger longitudinal study found that more frequent cognitive reappraisal use at ages 11-15 was correlated with fewer depressive symptoms at ages 14-19. If there is a relationship between earlier cognitive reappraisal use and later depressive symptoms, it is possible that the age range of middle childhood is too early in development to produce this longitudinal pattern. The relationship might only come into effect starting in early adolescence. Another exploratory analysis found that greater cognitive reappraisal use at ages 9-13 predicted greater cognitive reappraisal use at ages 11-15, and greater cognitive reappraisal use at ages 11-15 predicted greater cognitive reappraisal use at ages 14-19. This could mean that cognitive reappraisal use does indeed develop and increase through childhood and adolescence, but not strongly enough to create significant effects in adulthood depression.

Conclusion

The teachability of cognitive reappraisal in child populations is an important future direction for clinical developmental research in childhood depression. If cognitive reappraisal is to be used effectively in psychotherapy treatments for depression in middle childhood, we must examine in greater detail the factors that increase its effectiveness in reducing depressive symptoms. In previously mentioned studies, adults with depression are able to learn and implement cognitive reappraisal when instructed to do so in a lab setting. To the best of the author's knowledge, there have been no studies conducted on instructing individuals in middle childhood on improving their use of cognitive reappraisal.

Additionally, there have been few studies, even in adults, examining strategies that can improve the effectiveness of cognitive reappraisal in regulating emotions. Cognitive reappraisal is a higher-level emotion regulation strategy that individuals in general populations find fairly difficult to implement, both in lab settings and in their daily lives. However, a study by Diedrich et al. (2016) found that when participants practice self-compassion exercises before using cognitive reappraisal, their ability to alter their emotional experience is much more effective. Further research on the details of cognitive reappraisal training, both in adults and children, would contribute greatly to the field of psychotherapy development.

Cognitive reappraisal has great potential as an emotion regulation strategy that can reduce depressive symptoms in middle childhood. Since the ability to use cognitive reappraisal begins to develop in middle childhood, it is imperative that we offer children training in this skill as early as possible in order to alleviate depressive symptoms. Additionally, we know that childhood depression predicts adult depression. If we can use cognitive reappraisal as a tool to reduce depressive symptoms in middle childhood, then we can improve the wellbeing of children not only during childhood, but also during their adult lives.

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References

Aldao, A., Nolen-Hoeksema, S., Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical*

Psychology Review, 30, 217–237. https://doi.org/10.1016/j.cpr.2009.11.004

Arditte, K.A. & Joormann, J. (2011). Emotion regulation in depression: Reflection predicts recovery from a major depressive episode. *Cognitive Therapy and Research, 35*(6), 536-543. https://doi.org/10.1007/s10608-011-9389-4

Betts, J., Gullone, E., & Allen, J. S. (2009). Emotion regulation, temperament and parenting: predictors of adolescent depression risk status. *British Journal of Developmental Psychology, 27*(2), 473–485. https://doi.org/10.1348/026151008X314900

Chambers, R., Gullone, E., Hassed, C., Knight, W., Garvin, T., & Allen, N. (2015). Mindful emotion regulation predicts recovery in depressed youth. *Mindfulness, 6*(3), 523-534. https://doi.org/10.1007/s12671-014-0284-4

Compas, B. E., Jaser, S. S., Bettis, A. H., Watson, K. H., Gruhn, M. A., Dunbar, J. P., … Thigpen, J. C. (2017). Coping, emotion regulation, and psychopathology in childhood and adolescence: A meta-analysis and narrative review. *Psychological Bulletin, 143*(9), 939–991. https://doi.org/10.1037/bul0000110

Cree, R.A., Bitsko, R.H., Robinson, L.R., Holbrook, J.R., Danielson, M.L., Smith, D.S., Kaminski, J.W., Kenney, M.K., Peacock, G. (2016). Health care, family, and community factors associated with mental, behavioral, and developmental disorders and poverty among children aged 2–8 years — United States, 2016. *MMWR, 67*(5.0), 1377-1383. http://dx.doi.org/10.15585/mmwr.mm6750a1

D'Avanzato, C., Joormann, J., Siemer, M., & Gotlib, I.H. (2013). Emotion regulation in depression and anxiety: Examining diagnostic specificity and stability of strategy use. *Cognitive Therapy and Research, 37*(5), 968-980. https://doi.org/10.1007/s10608-013-9537-0

Denny, B. T., & Ochsner, K. N. (2014). Behavioral effects of longitudinal training in cognitive reappraisal. *Emotion*, 14(2), 425–433. https://doi.org/10.1037/a0035276

Diedrich, A., Hofmann, S. G., Cuijpers, P., & Berking, M. (2016). Self-compassion enhances the efficacy of explicit cognitive reappraisal as an emotion regulation strategy in individuals with major depressive disorder. *Behaviour Research and Therapy*, 82, 1–10. https://doi.org/10.1016/j.brat.2016.04.003

Dryman, M. T., & Heimberg, R. G. (2018). Emotion regulation in social anxiety and depression: A systematic review of expressive suppression and cognitive reappraisal. *Clinical Psychology Review, 65*, 17–42. https://doi.org/10.1016/j.cpr.2018.07.004

Ehring, T., Fischer, S., Schnülle, J., Bösterling, A., & Tuschen-Caffier, B. (2008). Characteristics of emotion regulation in recovered depressed versus never depressed individuals. *Personality and Individual Differences, 44*(7), 1574-1584. https://doi.org/10.1016/j.paid.2008.01.013

Ehring, T., Tuschen-Caffier, B., Schnülle, J., Fischer, S., & Gross, J. J. (2010). Emotion regulation and vulnerability to depression: Spontaneous versus instructed use of emotion suppression and reappraisal. *Emotion, 10*(4), 563-572. http://dx.doi.org/10.1037/a0019010

Ellis, A. J., Vanderlind, W. M., & Beevers, C. G. (2013). Enhanced anger reactivity and reduced distress tolerance in major depressive disorder. *Cognitive Therapy and Research, 37*(3), 498-509. https://doi.org/10.1007/s10608-012-9494-z

Gaffrey, M. S., Tillman, R., Barch, D. M., & Luby, J. L. (2018). Continuity and stability of preschool depression from childhood through adolescence and following the onset of puberty. *Comprehensive Psychiatry, 86*, 39–46. https://doi.org/10.1016/j.comppsych.2018.07.010
Garnefski N, & Kraaij V. (2006). Relationships between cognitive emotion regulation strategies and depressive symptoms: A comparative study of five specific samples. *Personality and Individual Differences, 40*, 1659–1669. https://doi.org/10.1016/j.paid.2005.12.009

Garnefski, N., & Kraaij, V. (2007). The Cognitive Emotion Regulation Questionnaire: Psychometric features and prospective relationships with depression and anxiety in adults. *European Journal of Psychological Assessment, 23*(3), 141-149. https://doi.org/10.1027/1015-5759.23.3.141

Garnefski, N., & Kraaij, V. (2006). Cognitive Emotion Regulation Questionnaire: Development of a short 18-item version (CERQ-Short). *Personality and Individual Differences, 41*, 1045–1053. https://doi.org/10.1016/j.paid.2006.04.010

Garnefski, N., Legerstee, J., Kraaij, V., van den Kommer, T., & Teerds, J. (2002). Cognitive coping strategies and symptoms of depression and anxiety: A comparison between adolescents and adults. *Journal of Adolescence, 25*, 603–611. https://doi.org/10.1006/jado.2002.0507

Garnefski, N., Rieffe, C., Jellesma, F., Terwogt, M.M., & Kraaij, V. (2007). Cognitive emotion regulation strategies and emotional problems in 9 - 11-year-old children: the development of an instrument. *European Child and Adolescent Psychiatry*, *16*(1), 1-9. https://doi.org/10.1007/s00787-006-0562-3

Ghandour, R.M, Sherman, L.J., Vladutiu, C.J., Ali, M.M., Lynch, S.E., Bitsko, R.H., & Blumberg, S.J. (2019). Prevalence and treatment of depression, anxiety, and conduct problems in U.S. children. *The Journal of Pediatrics*. https://doi.org/10.1016/j.jpeds.2018.09.021

Joormann, J. (2010). Cognitive inhibition and emotion regulation in depression. *Current Directions in Psychological Science*, *19*(3), 161-166. https://doi.org/10.1177/0963721410370293

Kendler, K.S., Thornton, L.M., & Gardner, C.O. (2001) Genetic risk, number of previous depressive episodes, and stressful life events in predicting onset of major depression. *American Journal of Psychiatry*, *158*, 582–586. https://doi.org/10.1176/appi.ajp.158.4.582

Kudinova, A. Y., James, K., & Gibb, B. E. (2018). Cognitive reappraisal and depression in children with a parent history of depression. *Journal of Abnormal Child Psychology*, *46*(4), 849–856. https://doi.org/10.1007/s10802-017-0333-2

LeMoult, J., & Gotlib, I. H. (2019). Depression: A cognitive perspective. *Clinical Psychology Review*, *69*, 51–66. https://doi.org/10.1016/j.cpr.2018.06.008

Lopez, K.C., Luby, J.L., Belden, A.C., & Barch, D.M. (2018). Emotion dysregulation and functional connectivity in children with and without a history of major depressive disorder. *Cognitive, Affective, & Behavioral Neuroscience*, *18*, 232–248. https://doi.org/10.3758/s13415-018-0564-x

Luby, J. L., Gaffrey, M. S., Tillman, R., April, L. M., & Belden, A. C. (2014). Trajectories of preschool disorders to full DSM depression at school age and early adolescence: Continuity of preschool depression. *The American Journal of Psychiatry*, *171*(7), 768–776. https://doi.org/10.1176/appi.ajp.2014.13091198

Luby, J. L., Si, X., Belden, A. C., Tandon, M., & Spitznagel, E. (2009). Preschool depression: Homotypic continuity and course over 24 months. *Archives of General Psychiatry*, *66*(8), 897–905. https://doi.org/10.1001/archgenpsychiatry.2009.97

Millgram, Y., Joormann, J., Huppert, J.D., & Tamir, M. (2015). Sad as a matter of choice? Emotion-regulation goals in depression. *Psychological Science*, *26*(8), 1216-1228. https://doi.org/10.1177/0956797615583295

Murray, C.J., Vos, T., Lozano, R., et al. (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, *380*, 2197–2223. https://doi.org/10.1016/S0140-6736(12)61689-4

National Collaborating Centre for Mental Health (UK). (2005). *Depression in Children and Young People: Identification and Management in Primary, Community and Secondary Care.* Leicester (UK): British Psychological Society.

Pinquart, M., & Pfeiffer, J. P. (2018). Longitudinal associations of the attainment of developmental tasks with psychological symptoms in adolescence:

A meta-analysis. *Journal of Research on Adolescence*. https://doi.org/10.1111/jora.12462

Segrin, C., & Dillard, J. P. (1992). The interactional theory of depression: A meta-analysis of the research literature. *Journal of Social and Clinical Psychology*, *11*(1), 43–70. https://doi.org/10.1521/jscp.1992.11.1.43

Smoski, M., LaBar, K., & Steffens, D. (2014). Relative effectiveness of reappraisal and distraction in regulating emotion in late-life depression. *The American Journal of Geriatric Psychiatry*, *22*(9), 898-907. https://doi.org/10.1016/j.jagp.2013.01.070

Troy, A. S., Wilhelm, F. H., Shallcross, A. J., & Mauss, I. B. (2010). Seeing the silver lining: Cognitive reappraisal ability moderates the relationship between stress and depressive symptoms. *Emotion*, 10(6), 783–795. https://doi.org/10.1037/a0020262