

Support and conflict in relationships and psychological health in adolescents and young adults with cancer

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Abstract

Perceived support and conflict between adolescents and young adults with cancer and their primary caregivers, other family, close friends, and medical staff were examined in relation to adolescents and young adults' psychological health. Adolescents and young adults ($n = 115$, 51% male, ages 12–24 years, M (standard deviation) = 16.07 (2.29)) in outpatient cancer treatment perceived more support and conflict within familial relationships than other relationships. Among familial relationships, perceived support and conflict were associated with psychological health; within other relationships, only support was associated with psychological health. Interactions among family were most strongly correlated with psychological distress; interactions with friends were stronger correlates of posttraumatic stress symptoms, positive affect, and posttraumatic growth.

Keywords

adolescents and young adults, cancer, conflict, psychological health, relationships, support

Over 68,000 adolescents and young adults (AYAs) are diagnosed with cancer annually in the United States (National Institutes of Health, 2012), yet their psychosocial needs are often not recognized or met (Morgan et al., 2010). AYAs with cancer often report high levels of psychological distress (PD) (Meeske et al., 2001) and posttraumatic stress symptoms (PTSS) (Brown et al., 2003). Conversely, many AYA patients also report high levels of positive affect (PA) (Schroevers et al., 2000) and posttraumatic growth (PTG) (Barakat et al., 2006). Measures of psychological health such as PD, PTSS, PA, and PTG are often not strongly correlated (Barakat et al., 2006; Schroevers et al., 2000), yet each reflects an

important and independent aspect of psychological health (Bech et al., 2003; Folkman and Moskowitz, 2000). Psychological health is often associated with AYAs' perceptions of support and conflict within multiple interpersonal relationships (Manne and Miller, 1998), but whether associations are specific to the

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measure of psychological health or relationship is not well understood. This research addresses this gap by examining AYA cancer patients' perceived support and conflict within four important interpersonal relationships—their primary caregiver, other family, close friends, and medical staff—in relation to their PD, PTSS, PA, and PTG.

Families with AYAs with a chronic illness differ from families with healthy AYAs. For example, these families often experience a significant disruption to normal family processes through maladaptive behaviors and responses to the illness, yet may demonstrate significant resilience through positive and adaptive behaviors and responses (Costigan et al., 1997; Lennon et al., 2015). These disruptions can come from needing to negotiate multiple responsibilities and stressors (e.g. managing medical regimens, limited time for recreational activities, and medical visits), which may lead to increased parental stress and decreased family functioning. However, many families are able to successfully adapt to these challenges and thrive (McClellan and Cohen, 2007). Similarly, peer relationships may be disrupted by chronic illness (e.g. AYAs may not have as much time to spend with friends) (Abrams et al., 2007; Suris et al., 2004), but peers can also serve as valuable resources in promoting resilience (e.g. by helping to re-integrate AYAs into social circles) (Abrams et al., 2007).

Relationships with family, peers, and other important adults all uniquely contribute to AYAs' psychological health (Sterrett et al., 2011). AYAs with cancer report family members to be their most prominent relationships, with primary caregivers providing the most support (Juth, 2016). At the same time, relationships with friends are also very important, as they provide a sense of normalcy that may otherwise be difficult to attain when undergoing cancer treatments (Galán et al., 2016). Finally, AYAs rely on medical staff for information and to provide psychological support, which may result in these relationships contributing to their psychological health (Galán et al., 2016).

Both support and conflict within these relationships may be independently important (Rafaeli et al., 2008). Supportive relationships are often associated with better psychological health (Castellano-Tejedor et al., 2016; Decker, 2007; Manne and Miller, 1998; Ozono et al., 2010). For example, parental support is associated with lower depression and PTSS (Ozono et al., 2010). AYAs also desire support from other family, friends, and medical staff (Decker, 2007), but report that these needs are often not adequately met (Galán et al., 2016). Given that AYAs with cancer desire multiple supportive relationships, it is possible that perceptions of support within each relationship is associated with their psychological health.

AYAs with cancer also experience conflict within their relationships (Manne and Miller, 1998). AYAs with cancer face normative developmental challenges including autonomy building, identity formation, and independence seeking, but are often heavily reliant on their caregivers, leading to conflict (Grinyer, 2009). Conflict within other relationships may arise due to treatment-related physical symptoms or changes in their physical appearance (Hokkanen et al., 2004), or if others do not fully understand their experiences or respond poorly to their needs (Abrams et al., 2007). However, findings are inconsistent regarding associations between AYAs' perceptions of conflict and their psychological health. For instance, conflict with mothers, but not fathers or friends, has been linked with higher levels of PD (Manne and Miller, 1998), and conflict with mothers and fathers is sometimes associated with higher levels of PTSS (Ozono et al., 2010), but not always (Brown et al., 2003).

Most research on interpersonal conflict among AYAs with cancer focuses on associations between familial relationships and negative aspects of psychological health, such as PD and PTSS. Less is known about the importance of conflict in other relationships or how conflict may be related to positive aspects of psychological health, such as PA and PTG. Therefore, research examining the relative importance of conflict within different relationships for both

negative and positive aspects of psychological health is needed.

The present study

We sought to better understand associations between perceived support and conflict with primary caregivers, other family, close friends, and medical staff, and four measures of psychological health (PD, PTSS, PA, and PTG) among AYAs in outpatient cancer treatment. First, we examined AYA's perceived support and conflict within the four relationships. Second, within each relationship, we examined whether perceived support and conflict were each associated with each measure of psychological health. Third, we compared overall relationships to determine which was most strongly associated with each measure of psychological health. We tested the following hypotheses:

Hypothesis 1. AYAs will report higher levels of perceived support and higher levels of perceived conflict from primary caregivers than from their other relationships.

Hypothesis 2. Higher perceived support and lower perceived conflict in all relationships will be associated with better psychological health (i.e. lower PD and PTSS, higher PA and PTG). We did not have a priori expectations about whether support or conflict would be stronger correlates of PD, PTSS, PA, or PTG.

Hypothesis 3. AYAs' overall relationship (i.e. including both support and conflict together) with their primary caregivers, compared to their other relationships, will have stronger associations with PD, PTSS, PA, and PTG.

Age (Britto et al., 2004), ethnicity (Smith et al., 2013), time since diagnosis (Barakat et al., 2006; Smith et al., 2013), and medical treatment intensity (Kazak et al., 2010) were included as covariates in our analyses as they have been found to be associated with AYAs' social relationships and/or psychological health.

Method

Participants and procedures

The oncology department of a large pediatric research hospital identified eligible participants if they were aged 12–24 years, receiving outpatient cancer treatment, spoke English or Spanish, and had caregivers who spoke English or Spanish. Caregivers (84% mothers, 10% fathers, 6% others) were recruited by trained undergraduate research assistants or doctoral students; study personnel were scheduled for recruitment shifts at the hospital and attempted to recruit all eligible participants during their shifts. Caregivers were required to give written consent; patients were then recruited and gave written assent or consent (if over age 18). AYAs were first approached during an outpatient treatment visit within 60 months of their initial cancer diagnosis. After completing assent or consent, research personnel gave participants the questionnaire on paper or directed them to a website to complete it. Instructions for survey completion were given by research personnel and were written on the survey. Participants could choose to complete the study at the hospital or at home; those opting to complete the study online at the hospital used a study laptop to do so.

Type of primary caregiver (mothers or others), location of survey completion (at home or in the hospital), and survey completion method (online or on paper) were not associated with any outcome measures ($ps > .05$). The survey took approximately 30 minutes to complete, and data collection was completed over an 18-month period. AYAs received US\$25 gift cards for participating. Procedures were approved by appropriate Institutional Review Boards.

Participant characteristics. In all, 86% of eligible AYAs approached completed the study ($n = 115$; 51% male, ages 12–24 years, $M = 16.07$, standard deviation (SD) = 2.29). A total of 49 participants (42.6%) were Hispanic or Latino, 41 (35.7%) Caucasian, 13 (11.3%) Asian, and 12 (10.4%) were mixed or other ethnicities. A total

of 41 participants were diagnosed with leukemia (35.7%), 24 with lymphoma (20.9%), 17 with germ cell or gonadal cancer (14.8%), 10 with bone cancer (8.7%), 8 with sarcomas (7.0%), 7 with brain or central nervous system cancers or glioma (6.1%) and 8 other cancers (7.0%). Mean time since diagnosis was 32.17 months ($SD=22.27$, range=2–80) prior to participation. AYAs averaged 2.82 health care visits in the month prior to participation ($SD=3.96$, range=0–19). AYAs who participated were not different by gender, time since diagnosis, or cancer type from those who declined to participate ($ps>.05$), but were younger ($p<.01$). No other demographic or illness information was available from AYAs who declined to participate.

Measures

Demographic and medical information. Participants' age, ethnicity, gender, cancer type, and time since diagnosis in months were obtained from hospital records. Health care use was calculated as the number of hospital visits in the 30 days prior to the patient's survey completion.¹

Perceived support and conflict. Perceived support from and conflict with primary caregivers, other family, close friends, and medical staff within the previous week were assessed using two items each (Abbey et al., 1985; Gil-Rivas et al., 2004). Support items asked how often people within these relationships helped the participant "understand or figure things out" and "provide you with encouragement." Conflict items asked how often the participant had "a disagreement" and "become openly angry" within each relationship. Items were rated from 1 (never) to 5 (all the time), with an option for "not applicable" if they did not have relationships with these individuals. These items have previously been used with adolescents in the context of support and conflict following traumatic experiences (Gil-Rivas et al., 2004). AYAs were asked to identify their primary caregivers, but were not

asked to identify specific other family, close friends, or medical staff. Support and conflict items were averaged separately for each relationship; higher scores indicate higher perceived support and conflict within that relationship. Cronbach's alphas for support from primary caregivers=.80, other family=.76, close friends=.82, and medical staff=.84. Cronbach's alphas for conflict with primary caregivers=.83, other family=.73, close friends=.66, and medical staff=.67.

Psychological distress (PD). PD was assessed using the 18-item Brief Symptom Inventory (BSI-18) (Derogatis, 2001). Items were rated from 1 (not at all) to 5 (extremely). The BSI-18 has been previously used in medical populations including AYAs with cancer (e.g. Kwak et al., 2013). Scores were averaged ($\alpha=.86$); higher scores indicate greater PD.

Posttraumatic stress symptoms (PTSS). PTSS resulting from the AYA's illness were assessed using 16 items from the PTSD Checklist–Civilian Version (PCL) (Weathers et al., 1993).² Items were rated from 1 (not at all) to 5 (extremely). The PCL has been widely used following a range of traumas (see Juth et al., 2015). Scores were averaged ($\alpha=.84$); higher scores indicate higher levels of PTSS.

Positive affect (PA). PA was assessed using the 15 PA items from the Positive and Negative Affect Scale for Children (PANAS-C) (Laurent et al., 1999).³ Participants rated the frequency with which they experienced positive emotions from 1 (never) to 5 (all the time). The PANAS-C is well validated and widely used among children and adolescents (Ebesutani et al., 2011). Although not designed for adults, the PANAS-C has been used in adults when comparing across ages (e.g. Talbot et al., 2010).

Posttraumatic growth (PTG). PTG as a result of the AYA's illness was assessed using the 21-item Posttraumatic Growth Inventory (Tedeschi and

Calhoun, 1996). This scale has been used among a wide range of AYAs dealing with traumas, including medical populations (e.g. Meyerson et al., 2011). Items were rated from 1 (not at all) to 6 (to a very great degree). Scores were averaged ($\alpha = .94$); higher scores indicate greater PTG.

Analyses

Preliminary analyses used one-way analyses of variance (ANOVAs) and bivariate correlations to examine associations between psychological health measures and demographic and medical characteristics. Levels of perceived support and conflict in each of the relationships were skewed (negatively for support items and positively for conflict items; Shapiro–Wilk test of normality $ps < .05$), so non-parametric Wilcoxon signed-rank tests were used to compare levels of perceived support and conflict within AYAs' four relationships for *Hypothesis 1*. To test *Hypothesis 2*, whether support and conflict within each relationship were associated with psychological health, multiple hierarchical linear regression models were run for each relationship and each measure of psychological health. Demographics and medical characteristics were entered in Step 1. The significance of support, entered in Step 2a, and conflict, entered in Step 2b (with support removed), were then assessed for each measure of psychological health and for each relationship.

To test *Hypothesis 3*, whether relationships with primary caregivers were most strongly associated with each measure of psychological health, perceived support and conflict were included in the regression models together in Step 3. Overall effect sizes (overall R^2_{adjusted}) were visually compared across the relationships. To adjust for running four regression models with each outcome measure, a Bonferroni corrected ($p = .05/4$) $\alpha < .013$ was used to determine significance. Gender was not associated with independent or dependent variables so was not included in the models.

Results

Preliminary analysis

Our sample size provides the power to detect at least medium-sized to large-sized effects ($f^2 > .22$ for all analyses). One-way ANOVAs indicated that ethnicity was associated with differences in PA ($F(3,111) = 2.82, p = .042$) and PTG ($F(3,109) = 3.46, p = .019$), and cancer type was associated with differences perceived support from close friends ($F(3,110) = 6.26, p < .01$). Bonferroni post hoc analyses revealed Hispanic participants reported higher PA than mixed-ethnic participants and higher PTG than Caucasian participants ($ps < .05$). Participants with leukemia, lymphoma, and germ cell cancers perceived less support from close friends than those with other cancers ($ps < .05$). No other ethnic differences or differences by cancer type were found. Pairwise bivariate correlations between age, illness duration, health care use, perceptions of support and conflict across the four relationships and measures of psychological health are presented in Table 1.

Perceived support and conflict in relationships

Mean levels of perceived support and conflict in each relationship are presented in Table 1. As predicted in *Hypothesis 1*, Wilcoxon signed-rank test indicated that AYAs perceived significantly more support from primary caregivers than from other family ($Z = 2.32, p = .021$), close friends ($Z = 3.01, p = .003$), or medical staff ($Z = 3.34, p = .001$). Levels of perceived support were not significantly different between other relationships ($ps > .05$). AYAs also perceived more conflict with primary caregivers than with close friends ($Z = 5.08, p < .001$) or medical staff ($Z = 7.02, p < .001$), although perceived conflict with other family was not significantly different ($p > .05$). AYAs also perceived more conflict with other family than with close friends ($Z = 4.87, p < .001$) or medical staff ($Z = 6.82, p < .001$) and more conflict with friends than medical staff ($Z = 5.38, p < .001$).

Table 1. Means, standard deviations, and pairwise bivariate correlations between study variables.

	M (SD)	Age	Months since diagnosis	Health care use	Perceived support			Perceived conflict			PD	PTSS	PA
					Caregiver	Other family	Close friends	Caregiver	Other family	Close friends			
Age	16.1 (2.29)												
Months since diagnosis	32.2 (22.3)	.13											
Health care use	2.8 (4.0)	-.09	-.50**										
Support													
Caregiver	3.9 (1.1)	-.06	.07	-.03									
Other family	3.7 (1.2)	.15	-.04	.00	.56**								
Close friends	3.6 (1.2)	.21*	-.02	-.18	.36**	.61**							
Medical staff	3.5 (1.3)	.18	.05	-.05	.51**	.66**	.51**						
Conflict													
Caregiver	2.2 (1.0)	.02	-.11	-.13	-.23*	-.10	-.14	-.04					
Other family	2.1 (1.0)	-.16	-.00	-.17	-.05	-.16	-.11	-.03	.53**				
Close friends	1.6 (7)	-.12	-.16	-.09	-.22*	-.33**	-.16	-.19	.33**	.49**			
Medical staff	1.2 (4)	.07	-.17	.19	-.13	-.15	-.03	-.12	.04	.25*			
PD	1.3 (3)	.18	.05	.14	.01	-.07	-.31**	-.10	.27**	.14	.06		
PTSS	1.6 (5)	.16	-.03	-.05	-.01	-.05	-.25**	-.09	.24*	.20*	.62**		
PA	3.7 (7)	.00	.00	-.08	.26**	.21*	.47**	.30**	-.10	-.15	-.38**	-.29**	
PTG	4.1 (1.1)	.17	-.00	-.05	.28**	.44**	.49**	.36**	-.09	-.18	-.14	-.07	.38**

SD: standard deviation; PD: psychological distress; PTSS: posttraumatic stress symptoms; PA: positive affect.
Note: *p < .05, **p < .01.

Comparing associations of perceived support and conflict on psychological health

Hierarchical linear regression analyses tested whether perceived support and conflict within each relationship predicted each measure of psychological health when included in the model separately. In relationships with primary caregivers (ΔR^2 s for steps 2a and 2b are presented in Table 2), PD and PTSS were significantly associated with perceived conflict (PD $R^2_{\text{adjusted}} = .166$, $\beta = .382$; PTSS $R^2_{\text{adjusted}} = .077$, $\beta = .265$, $ps < .008$) but not with perceived support (PD $R^2_{\text{adjusted}} = .039$, $\beta = .009$; PTSS $R^2_{\text{adjusted}} = .001$, $\beta = .007$, $ps > .013$); PA and PTG were significantly associated with perceived support (PA: $R^2_{\text{adjusted}} = .079$, $\beta = .268$; PTG $R^2_{\text{adjusted}} = .109$, $\beta = .280$, $ps < .005$) but not conflict (PA: $R^2_{\text{adjusted}} = .013$, $\beta = -.099$; PTG $R^2_{\text{adjusted}} = .030$, $\beta = -.059$, $ps > .013$). Similarly, in relationships with other family (ΔR^2 s for step 2a and 2b are presented in Table 3), PD and PTSS were significantly associated with conflict (PD $R^2_{\text{adjusted}} = .168$, $\beta = .399$; PTSS $R^2_{\text{adjusted}} = .071$, $\beta = .261$, $ps < .013$) but not with support (PD $R^2_{\text{adjusted}} = .026$, $\beta = -.030$; PTSS $R^2_{\text{adjusted}} = .011$, $\beta = -.059$, $ps > .013$). PTG was associated with perceived support ($R^2_{\text{adjusted}} = .170$, $\beta = .328$, $p = .001$) and not conflict ($R^2_{\text{adjusted}} = .066$, $\beta = -.073$, $p > .013$), and PA was not associated with perceived support ($R^2_{\text{adjusted}} = .042$, $\beta = .199$, $p > .013$) or conflict ($R^2_{\text{adjusted}} = .002$, $\beta = -.024$, $p > .013$). Among familial relationships, *Hypothesis 2* was partially supported in that support and conflict predicted measures of psychological health, although they were not both predictive of any one measure of psychological health.

In contrast, in relationships with close friends (ΔR^2 s for steps 2a and 2b are presented in Table 4), perceived support was significantly associated with all psychological health measures (PD $R^2_{\text{adjusted}} = .106$, $\beta = -.299$; PTSS $R^2_{\text{adjusted}} = .105$, $\beta = -.320$; PA $R^2_{\text{adjusted}} = .223$, $\beta = .481$; PTG $R^2_{\text{adjusted}} = .213$, $\beta = .400$, $ps < .013$), while perceived conflict was not (PD $R^2_{\text{adjusted}} = .073$, $\beta = .239$; PTSS $R^2_{\text{adjusted}} = .049$, $\beta = .212$; PA

$R^2_{\text{adjusted}} = .025$, $\beta = -.164$; PTG $R^2_{\text{adjusted}} = .061$, $\beta = -.039$, $ps > .013$). Finally, in relationships with medical staff (ΔR^2 s for steps 2a and 2b are presented in Table 5), PA and PTG were significantly associated with perceived support (PA $R^2_{\text{adjusted}} = .124$, $\beta = .339$; PTG $R^2_{\text{adjusted}} = .204$, $\beta = .327$, $ps < .013$) but not perceived conflict (PA $R^2_{\text{adjusted}} = .028$, $\beta = .141$; PTG $R^2_{\text{adjusted}} = .097$, $\beta = .019$, $ps > .013$), and neither PD nor PTSS were significantly associated with perceived support (PD $R^2_{\text{adjusted}} = -.003$, $\beta = -.127$; PTSS $R^2_{\text{adjusted}} = .029$, $\beta = -.150$, $ps > .013$) or conflict (PD $R^2_{\text{adjusted}} = -.018$, $\beta = .016$; PTSS $R^2_{\text{adjusted}} = .001$, $\beta = -.010$, $ps > .013$). Thus, with close friends and medical staff, *Hypothesis 2* was largely unsupported, as only perceived support was associated with any measure of psychological health.

Overall associations of relationships and psychological health

To determine which relationship was most strongly correlated with each measure of psychological health, support and conflict were included together in Step 3 of each model, and the overall model R^2_{adjusted} was compared across relationships. As predicted by *Hypothesis 3*, relationships with primary caregivers (β s and standard errors (SEs) are included in Table 2, along with the final model R^2_{adjusted} and ΔR^2) and other family (Table 3) explained more variance in PD than did relationships with close friends (Table 4) or medical staff (Table 5). However, contrary to predictions, relationships with close friends explained more variance in PTSS, PA, and PTG than the other relationships, and relationships with medical staff explained more variance in PA and PTG than caregiver or other family relationships.

Discussion

This research examined AYA cancer patients' perceived support and conflict in relationships with primary caregivers, other family, close friends, and medical staff and their associations with PD, PTSS, PA, and PTG. Our findings

Table 2. AYAs' Relationships with Primary Caregivers and Psychological Health.

Step	Distress		Posttraumatic Stress		Positive Affect		Posttraumatic Growth	
	<i>n</i> =(105)		<i>n</i> =(107)		<i>n</i> =(107)		<i>n</i> =(105)	
	β (SE)	ΔR^2	β (SE)	ΔR^2	β (SE)	ΔR^2	β (SE)	ΔR^2
1	.244(.015)*	.094	.210(.021)	.075	.023(.029)	.069	.149(.048)	.092
Age								
Ethnicity ^a								
Hispanic	.046(.075)		.073(.106)		-.092(.146)		.255(.243)	
Asian	.033(.113)		-.027(.163)		.003(.223)		.239(.363)	
Other	.063(.114)		-.096(.163)		.214(.223)		.198(.365)	
Months since diagnosis	.261(.002)		-.021(.003)		.003(.004)		.072(.006)	
Health care use	.384(.010)*		-.016(.015)		-.029(.020)			
2a	.081(.030)	.001	.061(.043)	.001	.260(.059)*	.071*	.271(.099)*	.077*
2b	.394(.034)**	.128**	.282(.049)*	.064*	-.035(.067)	.009	-.024(.111)	.003
3	.166(.136)**		.073(.068)		.071(.072)		.100(.078)	
Final model R^2_{adj} (ΔR^2)								
<i>F</i> (<i>df</i> , <i>df</i>)	3.583(8,96)**		2.046(8,98)		2.013(8,98)		2.449(8,96)	

Note. Beta coefficients shown are estimates from the final model. ΔR^2 reflects the change in R^2 for each step. Step 2a added support; Step 2b removed support and added conflict. Step 3 included both support and conflict. Final $R^2_{adjusted}$ and ΔR^2 are for Step 3 relative to the covariates alone. Sample sizes differ due to listwise deletion of missing data. *Bonferroni corrected $p < .013$, ** $p < .001$.

^aReference group is Caucasian patients.

Table 3. AYAs' Relationships with Other Family and Psychological Health.

Step	Distress		Posttraumatic Stress		Positive Affect		Posttraumatic Growth	
	n=(103)		n=(105)		n=(105)		n=(103)	
	β (SE)	ΔR ²	β (SE)	ΔR ²	β (SE)	ΔR ²	β (SE)	ΔR ²
1	.296(.015)*	.092	.230(.021)	.074	-.029(.029)	.069	.052(.045)	.125
Age								
Ethnicity ^a								
Hispanic	.007(.075)		.045(.111)		-.078(.152)		.242(.234)	
Asian	.013(.115)		-.041(.169)		-.002(.232)		.201(.351)	
Other	.081(.116)		-.102(.169)		.230(.232)		.189(.352)	
Months since diagnosis	.213(.002)		-.090(.003)		.048(.004)		.062(.006)	
Health care use	.385(.010)*		-.042(.015)		-.018(.021)		-.013(.031)	
2a Support	-.003(.029)	.001	-.039(.043)	.003	.198(.059)	.038	.324(.092)*	.102*
2b Conflict	.398(.037)**	.133**	.258(.054)*	.060*	-.007(.074)	.001	-.039(.113)	.005
3	.159(.136)*		.063(.061)		.033(.038)		.163(.103)*	
Final model R ² _{adj} (ΔR ²)								
F(df, df)	3.411(8,94)*		1.875(8,96)		1.437(8,96)		3.477(8,94)*	

Note. Beta coefficients shown are estimates from the final model. ΔR² reflects the change in R² for each step. Step 2a added support; Step 2b removed support and added conflict. Step 3 included both support and conflict. Final R²_{adjusted} and ΔR² are for Step 3 relative to the covariates alone. Sample sizes differ due to listwise deletion of missing data. *Bonferroni corrected $p < 0.013$, ** $p < .001$.

^aReference group is Caucasian patients.

Table 4. AYAs' Relationships with Close Friends and Psychological Health.

Step	Distress		Posttraumatic Stress		Positive Affect		Posttraumatic Growth	
	n=(102)		n=(104)		n=(104)		n=(102)	
	β (SE)	ΔR ²	β (SE)	ΔR ²	β (SE)	ΔR ²	β (SE)	ΔR ²
1								
Age	.297(.015)*	.087	.266(.021)*	.074	-.112(.026)	.067	.031(.044)	.125
Ethnicity ^a								
Hispanic	-.023(.078)		.032(.109)		-.097(.136)		.212(.232)	
Asian	-.062(.115)		-.084(.162)		.001(.202)		.226(.338)	
Other	.023(.115)		-.114(.162)		.175(.202)		.160(.338)	
Months since diagnosis	.143(.002)		-.120(.003)		.066(.003)		.138(.006)	
Health care use	.225(.011)		-.141(.015)		.046(.018)		.112(.031)	
2a Support	-.262(.031)*	.081*	-.289(.044)*	.092*	.466(.054)**	.209**	.405(.093)**	.143**
2b Conflict	.183(.051)	.050	.155(.070)	.040	-.073(.088)	.024	.032(.153)	.001
3								
Final model R ² _{adj} (ΔR ²)	.127(.110)*		.118(.113)*		.219(.213)**		.205(.144)**	
F(df, df)	2.841(8, 93)*		2.729(8, 95)*		4.617(8, 95)**		4.265(8, 93)**	

Note. Beta coefficients shown are estimates from the final model. ΔR² reflects the change in R² for each step. Step 2a added support; Step 2b removed support and added conflict. Step 3 included both support and conflict. Final R²_{adjusted} and ΔR² are for Step 3 relative to the covariates alone. Sample sizes differ due to listwise deletion of missing data. *Bonferroni corrected $p < .013$, ** $p < .001$.

^aReference group is Caucasian patients.

Table 5. AYAs' Relationships with Medical Staff and Psychological Health.

Step	Distress		Posttraumatic Stress		Positive Affect		Posttraumatic Growth	
	$n=(96)$	ΔR^2	$n=(98)$	ΔR^2	$n=(98)$	ΔR^2	$n=(96)$	ΔR^2
	β (SE)		β (SE)		β (SE)		β (SE)	
1	.163(.018)	.056	.176(.024)	.078	-.016(.031)	.080	.093(.050)	.163*
Ethnicity ^a								
Hispanic	.024(.087)		.088(.120)		-.175(.153)		.188(.246)	
Asian	-.049(.138)		-.150(.191)		.040(.244)		.319(.383)*	
Other	.001(.124)		-.133(.171)		.232(.219)		.192(.346)	
Months since diagnosis	.072(.002)		-.164(.003)		.124(.003)		.144(.006)	
Health care use	.221(.011)		-.136(.005)		.008(.019)		.033(.030)	
2a Support	-.128(.028)	.015	-.156(.039)	.021	.372(.050)**	.107*	.337(.080)*	.099*
2b Conflict	-.006(.092)	-.001	-.036(.128)	.001	.202(.163)	.018	.068(.263)	.001
3 Final model $R^2_{adj}(\Delta R^2)$	-.014(.015)		.019(.022)		.154(.143)*		.199(.103)*	
$F(df, df)$.834(8,87)		1.233(8,89)		3.203(8,89)*		3.995(8,87)**	

Note. Beta coefficients shown are estimates from the final model. ΔR^2 reflects the change in R^2 for each step. Step 2a added support; Step 2b removed support and added conflict. Step 3 included both support and conflict. Final $R^2_{adjusted}$ and ΔR^2 are for Step 3 relative to the covariates alone. Sample sizes differ due to listwise deletion of missing data. *Bonferroni corrected $p<.013$, ** $p<.001$.

^aReference group is Caucasian patients.

highlight the importance of support and conflict within multiple relationships and the importance of multiple measures of psychological health.

AYAs' higher perceptions of support and conflict within familial relationships (i.e. primary caregivers and other family) compared to other relationships is consistent with previous research showing higher levels of support and conflict with family than with friends and with research showing parents as AYAs' main source of support (Manne and Miller, 1998). Age, time since diagnosis, and health care utilization were not associated with AYAs' perceptions of support or conflict. Interpersonal relationships may matter equally regardless of how old patients are and their medical characteristics, despite AYAs' beliefs that they might differ (Britto et al., 2004).

Since conflict with parents and with peers is developmentally normative (Collins and Steinberg, 2006), it is possible that AYAs' conflicts were not specifically related to their cancer diagnoses or treatments. Additionally, perceptions of support and of conflict were correlated across relationships. This is consistent with research indicating that adolescents' perceptions of support within relationships are determined more by the perceiver than by the provider (Branje et al., 2002). Perceptions of conflict may similarly reflect the perceiver.

Within familial relationships, associations between support or conflict and psychological health were valence-congruent. That is, perceived support was associated with positive aspects of psychological health (i.e. PA and PTG), while perceived conflict was associated with negative aspects of psychological health (i.e. PD and PTSS). This is consistent with research showing that in intimate relations in adults, support predicts positive and not negative emotions, while conflict is a stronger predictor of negative emotions (Rafaeli et al., 2008). On the other hand, only support within relationships with friends and medical staff was associated with psychological health. Support may be particularly important in these relationships since AYAs with cancer specifically report desiring support from friends and medical staff

(Galán et al., 2016), and conflict is rarer in these relationships. Given that support and conflict are largely correlated across the relationships, it is possible that there is a third variable (e.g. a personality factor) that promotes support and inhibits conflict and leads to psychological health outcomes.

Conflict with family may be associated with psychological health because it is often related to AYAs' cancer treatment regimens (Grinyer, 2009), leading to long-term behavioral implications. Low levels of perceived conflict within other relationships may partly explain the lack of associations between conflict with friends or medical staff and psychological health. These findings may indicate that interventions focusing on the overall familial relationships—but only support within other relationships—could be targeted for interventions addressing AYAs' psychological needs. Psychosocial interventions addressing family and peer relationships among AYAs with chronic illnesses, although less common than interventions addressing education or individual coping, tend to be effective (Sansom-Daly et al., 2012; Zebrack and Isaacson, 2012). Family-focused interventions, for example, helping families manage illness-concerns together, can reduce family conflict (Husted et al., 2011) and may ultimately improve AYAs psychological health. Interventions that develop peer relationships, both with healthy and other chronically ill peers, can help build coping skills, increase perceptions of emotional support, and increase psychosocial resilience (Zebrack and Isaacson, 2012).

Contrary to our hypothesis, relationships with primary caregivers were the strongest correlate only of PD. Instead, relationships with close friends were stronger correlates of PTSS, PA, and PTG. Positive relationships with friends may allow AYAs to feel a sense of normalcy, contributing to better psychological health (Morgan et al., 2010), and may highlight the relative importance of close friendships compared to other relationships. Since AYAs are typically less satisfied with support from friends than from parents (Haluska et al., 2002),

the relationships with close friends may be an important potential target for increasing positive psychological health in AYAs with cancer. Although we found substantial correlations between psychological health measures, the different relationship correlates of each measure suggest that they are unique outcomes.

Limitations

Our cross-sectional design prohibits inferences about directionality of effects; better psychological health may lead to better relationships rather than relationships leading to psychological health. This also limits the interpretations about the non-significant effects of demographic and medical information. Longitudinal research to examine AYA cancer patients' relationships over time and disease progression is needed to overcome these limitations. Additionally, this study included limited information about the nature of AYAs' relationships beyond their perceptions of support and conflict within them and were based only on self-report. Results could be due to differences in the nature of these relationships (e.g. the number or closeness of friends, or the presence of siblings), or due to the lack of specificity in the assessment of the relationships (e.g. it is not clear who the "other" family members are), rather than merely the support and conflict perceived within them. Using a single type of data (i.e. self-reported) risks common-method variance; future research may benefit from including data from other sources (e.g. reports from family, friends, or medical staff) or other types of data (e.g. observational or behavioral measures).

Finally, our diverse but limited sample provides a broad view of the AYA cancer experience, but these findings should be generalized to other AYA populations with care. Because we only include AYAs with cancer and did not have a control group of healthy AYAs, we cannot determine how these results would compare with healthy populations or AYAs with other illnesses. Perceived support and conflict is also related to psychological health in healthy AYAs and those with other chronic illnesses (e.g.

Abbey et al., 1985; Helsen et al., 2000; Herzer et al., 2009), so our research cannot determine definitively what is normative rather than specific to the cancer experience.

Conclusion

Our findings provide insights into the importance of multiple relationships and of assessing multiple measures of psychological health for AYAs with cancer. Perceptions of support and/or conflict within relationships with primary caregivers, other family, close friends, and medical staff were associated with positive or negative aspects of psychological health and so may be important targets for interventions. Specifically, targeting support provision among relationships with friends or medical staff, and both support provision and conflict resolution among familial relationships, may lead to improved psychological health among AYAs with cancer. Finally, among AYAs with cancer, positive and negative measures of psychological health have different correlates; including both types of measures in future research will provide greater understanding of their psychological health.

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Notes

1. Analyses were also run including health care use over the previous 6 months and were not substantially different. As a result, only health care use over the previous 30 days was retained.
2. The original PTSD Checklist (PCL) (Weathers et al., 1993) includes a 17th item, "Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)." This item was removed from the current survey because cancer patients continue to experience stressful events throughout their treatment.
3. Negative items in the Positive and Negative Affect Scale (PANAS) were not included because overlapping constructs were measured in the Brief Symptom Inventory (Derogatis, 2001).

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