Dyadic coping and social support: Various types of support in hematooncological patients and their spouses—Associations with psychological distress

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Abstract
Objective: Patients and spouses use various support strategies to deal with cancer and its associated burden. Support can be perceived within the dyad [perceived dyadic coping (PDC)] or from others [perceived social support (PSS)]. The present study investigates the association of PDC and PSS with depression and anxiety symptoms experienced by hematooncological dyads.

Methods: A total of 330 hematooncological dyads participated in the study. Dyadic Coping Inventory (DCI) including perceived stress communication and four PDC strategies (supportive, negative, delegated, common), ENRICHED Social Support Instrument (ESSI) and Patient Health Questionnaire-4 (PHQ-4) are used for assessment. To take nonindependence of patient’s and spouse’s variables into account, data are analyzed with the Actor-partner-interdependence model (APIM).

Results: Hematological cancer patients and their spouses reported a similar level of depression and anxiety symptoms. Perceived negative dyadic coping (DC) was adversely related with both patient’s and spouse’s outcomes (all \textit{p}<0.01) and perceived positive DC was adversely related with depression symptoms in both and anxiety symptoms in spouses (all \textit{p}<0.05). More PSS was associated with less depression and anxiety symptoms in both (all \textit{p}<0.05), and spouse’s PSS (\textit{b} = −0.04, \textit{p}<0.05) was significantly associated with patient’s depression symptoms.

Conclusions: This study highlights the association between perceived negative DC, perceived positive DC and PSS with depression and anxiety symptoms. Focus should be on enhancement of PSS especially in spouses, as they experience a comparable amount of psychosocial distress and have considerable impact on the patient’s wellbeing.

Keywords
actor-partner interdependence model, anxiety, cancer, couples, depression, dyadic coping, psychological distress, psycho-oncology, social support, spouse
Cancer affects patients and their spouses with a variety of psychosocial and emotional burden.\(^1\) Hematological cancer is often highly aggressive, life-threatening and thus necessitates prolonged and intensive treatments, which can be extremely exhausting.\(^2\) Therefore, patients with hematological cancer and their spouses may report higher levels of psychological distress compared to other cancer populations.\(^3,4\) Up to 27% (17%) of hematological cancer survivors suffer from anxiety (depression) disorder\(^5\) and up to 44% (27%) of their spouses.\(^4\) Although evidence suggest that patients and spouses are interdependent in physical and mental health,\(^6,7\) the majority of studies capture the individual instead of the dyadic level.

For coping with a persistent stressor (like cancer) and the associated burden, patients and spouses rely on a diverse range of support and coping strategies: individual coping, dyadic coping (DC), social support from friends and family and professional support.\(^8,9\) Bodenmann describes a stress-coping-cascade model that includes different coping and support forms applied in sequence.\(^10\) It is supposed that after the onset of stress, people start with individual coping, and in case of prolonged stress, they seek out for other support resources such as DC, social support or professional support. In most cases, different support types can occur simultaneously, especially in continuing and cumulating stressful situations.\(^10,11\) To date, usually individual coping and DC are considered together in research,\(^12,13\) while a study regarding breast cancer also includes social support from others.\(^14\) Overall, studies that examine different forms of support together are scarce.

Research concerning perceived support from the other partner (perceived dyadic coping (PDC)) and its association with psychological distress on a dyadic level in cancer population are scarce. A study with couples facing prostate cancer found no associations between perceived supportive DC and common DC with distress, but a positive association between perceived negative DC and distress in both.\(^15\) While a study with breast cancer couples report an association with common DC, an less depression symptoms.\(^16\) Furthermore, a study with breast cancer couples reports only a significant association of perceived spousal support of healthy spouses and less anxiety in patients (partner effect) and no associations with own levels of distress.\(^14\) Additionally, individual research with cancer survivors reports significantly lower levels of depression in patients if they perceive high support from their spouses.\(^17\)

Perceived social support (PSS) has repeatedly been associated with psychosocial outcomes in cancer patients and their spouses. Decreased quality and quantity of PSS are associated with increased depression symptoms and stress in breast cancer survivors.\(^18\) A negative association between PSS and psychological distress has been identified by other studies in different cancer populations.\(^8,14,19\) This association was also evident in spouses, although they report lower levels of support from family and friends.\(^14\) It should be noted that the provider of PSS is not specified in some studies\(^8,18,19\); therefore, it can include family and friends as well as spouses.

The present study aims to examine the association of different support forms with psychological distress experienced in hematological cancer dyads. First, it will be examined whether patients and their spouses differ regarding psychological distress, PDC and PSS. While this question has been addressed in other cancer populations,\(^14,15\) evidence at the level of dyads is hitherto still scarce, especially with regard to PSS in couples facing hematological cancer. Second, our study will examine to which extent PDC and PSS reported by patients and spouses are related to their psychological distress, considering the interdependence of the dyadic data. Based on the assumption that different support forms are used simultaneously in situations with a persistent stressor, PDC and PSS are simultaneously included in the analysis. Since research in this area regarding cancer population is scarce, the present analysis has explorative character and aimed to more thoroughly explore the association between PDC and psychosocial distress in a comparably large sample of patient-spouse dyads. Adding to previous research,\(^8,14,18,19\) we hypothesize that more PSS would be associated with less depression and anxiety symptoms in patients and their spouses.

## 2 | METHODS

### 2.1 | Participants and procedures

Between January 2013 and October 2014, patients and their spouses were recruited from three university cancer centers in Germany (Leipzig, Ulm and Regensburg). The study has been approved by the Ethics Committee of the Medical Faculty of the University of Leipzig (No. 298-12-24092012). Potential participants were identified by reviewing the cancer centers medical charts. The following inclusion criteria had to be fulfilled: (a) a patient with any hematologic cancer (diagnosis validated by medical records), (b) partnership (married or cohabiting), (c) age of the patient between 18 and 75 years and (d) adequate knowledge of German language. Exclusion criteria were (e) severe mental disorders (ICD10 diagnoses F0-F2) and (f) severe cognitive and/or physical impairments. Eligible couples were approached via the patient by a study research assistant at the cancer centers. After detailed information about the study and written informed consent of both, patient and spouse received a questionnaire with the request to fill in alone. The completed questionnaire could be postal returned, handed in at the clinic or was picked up again from a research assistant. Out of 568 eligible couples, 330 participated in the study (58%). Reasons for not participating were: no response to study request (56.2%), lack of interest in study (38.0%) and other reasons (5.8%). Participating patients did not differ from non-participating patients in terms of age and sex ($p > 0.05$).
2.2 Assessments

2.2.1 Sociodemographic and clinical data

Sociodemographic variables were assessed via self-report. Medical characteristics were extracted from patients’ medical records.

2.2.2 Dyadic coping

The ‘Dyadic Coping Inventory’ (DCI)\(^{20}\) assesses the own DC and the PDC from the partner with different subscales. Since the present study examines different forms of the perceived received support, only subscales of PDC are used: perceived stress communication (four items, e.g., ‘My partner let me know that he/she appreciate my practical support, advice or help’), perceived supportive DC (five items, e.g., ‘My partner show empathy and understanding’), perceived negative DC (four items, e.g., ‘My partner blame me for not coping well enough with stress’), perceived delegated DC (two items, e.g., ‘My partner take on things that I would normally do in order to help me out’) and common DC (five items, e.g., ‘We try to deal with the problem together and look for concrete solutions’). All items are rated on a five-point Likert scale (from 1 = ‘very rarely’ to 5 = ‘very often’). Thus, higher scores on each subscale indicate more of the respective behavior. Internal consistency of the subscales varied from \(\alpha = 0.71\) to \(\alpha = 0.92\).\(^{20}\) In comparison, internal consistency in our sample varied from \(\alpha = 0.70\) to \(\alpha = 0.88\) in patients and from \(\alpha = 0.71\) to \(\alpha = 0.91\) in spouses.

2.2.3 Perceived social support

The ENRICHED Social Support Instrument (ESSI) is a valid and reliable instrument for assessment of PSS.\(^{21}\) The five items (e.g., ‘Is there someone available to give you good advice about a problem?’) are rated on a five-point scale from 1 to 5 (‘at no time’ to ‘always’). Higher values indicate higher PSS while values below 18 (sum score range from 5 to 25) indicate lack of PSS.\(^{21}\) The internal consistency of the scale is Cronbach’s \(\alpha = 0.93\). In our sample the internal consistency is equal (patients: \(\alpha = 0.93\); spouses: \(\alpha = 0.94\)).

2.2.4 Psychological distress

Psychological distress is assessed with the screening scale Patient Health Questionnaire-4 (PHQ-4).\(^{22}\) It consists of a two-item depression scale (PHQ-2) and a two-item anxiety scale (GAD-2). The items are rated on a four-point Likert scale from 0 to 3 (‘not at all distressed’ to ‘nearly every day distressed’) related to distress of the last two weeks (e.g., ‘Feeling down, depressed or hopeless over the last two weeks’). A cut-off score of \(\geq 3\) in PHQ-2 and GAD-2 indicates elevated scores of depression and anxiety symptoms. In regard to the small number of items the internal consistencies are adequate with \(\alpha = 0.78\) for PHQ-2 and \(\alpha = 0.75\) for GAD-2 in a representative German sample.\(^{23}\) Internal consistencies in our sample are similar: PHQ-2 \(\alpha = 0.77\) (patients) and \(\alpha = 0.76\) (spouses) and GAD-2 \(\alpha = 0.76\) (patients) and \(\alpha = 0.75\) (spouses).

2.2.5 Relationship satisfaction

Relationship satisfaction, a control variable, is assessed with a short version of the ‘Partnership Questionnaire’ (PF-B-K)\(^{24}\) with nine items on a four-point Likert scale from 0 (‘never’) to 3 (‘very often’) (Cronbach’s \(\alpha = 0.84\) (patients) and \(\alpha = 0.85\) (spouses)).

2.3 Statistical analyses

Data analyses are conducted with IBM SPSS Statistics 26 and IBM SPSS Amos 26. Socio-demographic and medical data are reported using descriptive statistics. To examine differences in psychological distress, PDC and PSS between hematological cancer patients and their spouses \(t\)-tests for paired samples are calculated. Additionally, effect size Cohen’s \(d\) is calculated (effect sizes from 0.2 are considered small, from 0.5 as moderate, and from 0.8 as large).\(^{25}\) Due to the multiple testing a significance level of \(p < 0.006\) is projected (after Bonferroni adjustment).

Before model estimation, Pearson correlations are calculated over all variables of patients and spouses to determine the nonindependence of the dyad.\(^{26}\) To take this interdependency of dyadic data into account, data are analyzed using the Actor-Partner Interdependence Model (APIM). With the APIM both actor and partner effects are determined for patients and their spouses. In the present study the actor effect specifies the impact of the own predictor variable (PDC, PSS) on the own dependent variable (psychological distress), and the partner effect specifies the impact of the own predictor variable on the partner’s dependent variable. In order to avoid mix-up in concepts, ‘partner’ is only used referring to partner effect of the APIM and ‘spouse’ when referring to the patient’s life partner. Two APIMs are calculated, one for each dependent variable (depression and anxiety symptoms). Structural equation modeling (SEM) is used for statistical analysis of the APIM as recommended for distinguishable dyads. The standardized coefficients (for better comparability of the different scales) are computed using mean and standard deviation across the entire sample (patients and spouses).\(^{26}\) Age, gender and relationship satisfaction of patients and spouses are examined for potential correlations with psychological distress and DC.\(^{1,5}\) and are controlled in the APIMs. Power calculation was conducted with APIMPowerR Program (https://robert-a-ackerman.shinyapps.io/APIMPowerRdis/) and resulted in a sample size of 321 dyads (\(\alpha = 0.05\), \(\beta = 0.80\), estimated beta for actor effects = 0.35 and for partner effects = 0.15).

The following requirements are revised before APIMs are estimated using SEM: (1) test of collinearity with squared multiple
correlation ($R^2 > 0.90$ imply extreme multivariate collinearity), (2) analysis of multivariate outlier by using the mahalanobis distance statistic with a recommended conservative significance level of $p < 0.001$, (3) analysis of missing values with Little’s Missing Completely at Random (MCAR)-test and (4) test of univariate and multivariate normal distribution. Univariate normal distribution is evaluated with measure of skew and kurtosis (limit for skew |$>3$| and for kurtosis |$>10$|), because in large samples and surveys with rating scales statistical tests such as Kolmogorov–Smirnov or Shapiro–Wilk test become even with slight discrepancy from normality statistically significant. Furthermore, in most studies with rating scales multivariate normal distribution is not existent. As recommended, only a moderate breach of multivariate normal distribution will be assumed if univariate normal distribution is proven. After confirmation of requirements, missing values of type MCAR are imputed via Full Information Maximum Likelihood (FIML)-Estimation. FIML is selected due to comparable performance to multiple imputation and exceeded performance compared to other methods (listwise deletion, pairwise deletion, similar response imputation) for MCAR.

### 3 | RESULTS

#### 3.1 | Sample characteristics

The study included a total of 330 couples (209 male and 121 female patients). The mean age in patients is 57 years and in spouses 56 years. Majority of couples are married (85%) and are living together (96%). Thirty-seven percent of patients are employed and more than a half are retired. The mean duration of relationship is 30 years with a range from 3 months up to 56 years. The most frequently diseases in our sample are acute and chronic leukemia, non-Hodgkin lymphoma and multiple myeloma. For about two-quarter (69%) of the sample, time since cancer diagnosis is more than one year. Demographic and medical sample characteristics are given in Table 1.

#### 3.2 | Levels of perceived dyadic coping, perceived social support and psychological distress in patients and spouses

Patients and their spouses differ significantly in four of five PDC subscales. Patients report significantly less perceived stress communication ($d = 0.26$), significantly more perceived supportive DC ($d = 0.30$), significantly less perceived negative DC ($d = 0.29$) and significantly more perceived delegated DC ($d = 0.38$) compared to their spouses. Furthermore, patients report significantly more PSS ($d = 0.45$) than their spouses. Patients and their spouses do not differ significantly in their reported amount of depressive and anxiety symptoms (Table 2).

### 3.3 | Requirements for actor-partner-interdependence model calculation

Significant correlations among variables between and within dyad members imply nonindependence on individual level (Table S1). All requirements for SEM are met as followed: (1) The highest $R^2$ is calculated for PHQ-2 from patients with $R^2 = 0.62$ and therefore extreme multivariate collinearity is not assumed. (2) Three multivariate outliers were detected. Because of missing values, mahalanobis distance could not be estimated for 13 dyads. Conduction of analyses with and without outliers does not result in different outcomes. Since it can also be assumed that these participants actually responded more extremely than the remaining sample, no cases are excluded. (3) All variables have less than 2% missing values and missing completely at random can be assumed ($\chi^2(180) = 158.65, p = 0.87$). (4) All skew and kurtosis values are below the limit with the highest skew value of |$>1.4$| (SD = 0.13) and the highest kurtosis value of |$>1.46$| (SD = 0.27) for PSS of patients. Therefore, univariate and multivariate normal distribution are assumed.

### 3.4 | Perceived dyadic coping and perceived social support on depression symptoms

More perceived stress communication ($b = −0.24, SE = 0.09$, $z = −2.70, p = 0.007$) and more PSS ($b = −0.09, SE = 0.02$, $z = −4.26, p < 0.001$) in patients are associated with less depression symptoms in patients (actor effect). In contrast, more perceived supportive DC ($b = 0.40, SE = 0.12, z = 3.37, p < 0.001$), more perceived negative DC ($b = 0.62, SE = 0.12, z = 5.13, p < 0.001$) and more perceived delegated DC ($b = 0.19, SE = 0.08, z = 2.27, p = 0.023$) in patients are associated with more patient’s depression symptoms (actor effects). Additionally, two variables of the spouse are significantly associated with patient’s depression symptoms (partner effects): more perceived stress communication ($b = 0.35, SE = 0.09, z = 3.87, p < 0.001$) in spouses is associated with more depression symptoms in patients and more PSS ($b = −0.04, SE = 0.02, z = −2.27, p = 0.023$) in spouses is associated with less depression symptoms in patients. More perceived supportive DC ($b = 0.31, SE = 0.11, z = 2.85, p = 0.004$) and more perceived negative DC ($b = 0.30, SE = 0.11, z = 2.66, p = 0.008$) in spouses are both significantly related with more own depression symptoms (actor effects). In contrast, more PSS ($b = −0.07, SE = 0.02$, $z = −4.27, p < 0.001$) is associated with less depression symptoms in spouses. There are no significant associations with common DC of both patients and spouses. The variance explanation of the model for depression symptoms is $R^2 = 0.29$ in patients and $R^2 = 0.21$ in spouses. Age, gender and relationship satisfaction are controlled in the APIM. Only regression weights with a significance level of $p < .05$ are displayed in the APIM (Figure 1).
Table 1: Patient and spouse characteristics: Descriptive statistics of raw data

| Characteristics        | Patient               | Spouse                |
|------------------------|-----------------------|-----------------------|
|                        | N  | %  | N  | %  |
| Sex*                   |    |    |    |    |
| Male                   | 209| 63.3| 122| 37.0|
| Female                 | 121| 36.7| 208| 63.0|
| Age mean (SD, range)   | 57.0 (12.2, 22–76)    | 56.0 (12.6, 20–78)    |
| Employment             |    |    |    |    |
| Pension/early retirement | 178| 53.9| 119| 36.0|
| Employed               | 122| 37.0| 179| 54.2|
| Unemployed             | 6 | 1.8 | 16 | 4.8 |
| Other                  | 15 | 4.5 | 13 | 3.9 |
| Missing values         | 9  | 2.7 | 3  | 0.9 |
| Education              |    |    |    |    |
| <10 years              | 65 | 19.7| 72 | 21.8|
| 10 years               | 161| 48.8| 149| 45.2|
| >10 years (high school)| 99 | 30.0| 103| 31.2|
| Other                  | 5  | 1.5 | 4  | 1.2 |
| Missing values         | -  | -   | 2  | 0.6 |
| Couples                |    |    |    |    |
| Marital status         |    |    |    |    |
| Married                | 281| 85.2|    |    |
| Not married            | 49 | 14.8|    |    |
| Living together        |    |    |    |    |
| In same household      | 315| 95.5|    |    |
| In separate households | 12 | 3.6 |    |    |
| Missing values         | 3  | 0.9 |    |    |
| Duration of relationship – years, mean (SD) | 30.2 (15.2) |
| Disease type           |    |    |    |    |
| Acute leukemia         | 85 | 25.8|    |    |
| Chronic leukemia       | 73 | 22.1|    |    |
| Non-Hodgkin           | 69 | 20.9|    |    |
| Multiple myeloma       | 61 | 18.5|    |    |
| Other                  | 42 | 12.7|    |    |
| Time since diagnosis   |    |    |    |    |
| ≤1 year                | 104| 31.5|    |    |
| >1 year                | 226| 68.5|    |    |

*Five same-sex couples.

3.5 Perceived dyadic coping and perceived social support on anxiety symptoms

More perceived negative DC in patients (b = 0.59, SE = 0.13, z = 4.63, p < 0.001) is associated with more anxiety symptoms in patients. In contrast, more PSS (b = −0.08, SE = 0.02, z = −3.54, p < 0.001) is significantly related to less anxiety symptoms in patients. Additionally, there is one significant partner effect: more perceived stress communication of the spouse (b = 0.43, SE = 0.10, z = 4.53, p < 0.001) is associated with more anxiety symptoms in the patient. Regarding spouse’s variables, perceived supportive DC (b = 0.27, SE = 0.11, z = 2.45, p = 0.014) and perceived negative DC (b = 0.35, SE = 0.12, z = 2.99, p = 0.003) are positively related to anxiety symptoms in spouses. In contrast, PSS (b = −0.03, SE = 0.02, z = −1.98, p = 0.048) is negatively associated with anxiety symptoms in spouses. There is also a significant partner effect: perceived supportive DC of the patient
(b = 0.33, SE = 0.12, z = 2.82, p = 0.005) is positively related to spouse’s anxiety symptoms. There are no significant associations with perceived delegated DC and common DC of both patients and spouses. The variance explanation of the model for anxiety symptoms is $R^2 = 0.28$ in patients and $R^2 = 0.24$ in spouses. Age, gender and relationship satisfaction are controlled in the APIM. Only regression weights with a significance level of $p < .05$ are displayed in the APIM (Figure 2).

### 4 | DISCUSSION

In this dyadic study with hematological cancer patients and their spouses, it was investigated in which way PDC and PSS are related to patient’s and spouse’s depression and anxiety symptoms. First, we identified some differences in patient’s and spouse’s levels of PDC. In our sample, patients reported significant less perceived stress communication from their spouses while spouses reported more perceived stress communication from the patient. This is consistent with both the tendency of spouses not wanting to burden the patient additionally with their problems\(^{31}\) and spouses being the primary source of conversation for patients.\(^{32}\) Furthermore, patients in our sample reported significant more perceived supportive DC and delegated DC, which means that they receive more support and get more tasks taken on compared to spouses. Rottmann et al. (2015) explained this by a patient-caregiver role effect, which implies that the patient needs help, and the spouse provides it.\(^{16}\) Patients reported significant less perceived negative DC than spouses, what can be explained by spouses are motivated to support the patient in this life-threatening situation and do not want to burden them additionally with ambivalent or hostile behavior. In addition, spouses reported significant less PSS, which is in line, that patients are in focus of the care and support system, while spouses are only perceived as caregivers, and therefore, they are neglected in their support needs.\(^{14}\) Taken together it seems that hematological cancer dyads were similar in their PDC and PSS to other cancer types.\(^{14,15,33}\) Since scores of depression and anxiety did not differ significantly between patients and spouses, both were burdened similarly.

**Perceived stress communication** First, we found that patient’s perceived stress communication from the spouse was related with less depression symptoms in patients, which emphasizes the importance of open communication. This association was not found in spouses. Comparison of these results to previous studies is difficult, since stress communication was assessed in different ways: perception of common stress communication\(^{34}\) or own provided stress communication.\(^{35}\) In contrast, spouse’s perceived stress communication from the patient was positively associated with patient’s...
Perceived supportive dyadic coping. Perceived supportive DC was associated with more depression symptoms in both. Realizing how much supportive behavior the other offers, may both feel less self-efficacy and therefore feeling more depressed. It could also indicate that when both perceived more supportive DC (e.g., 'My partner makes me feel that he/she understand me and that he/she care about my stress'), they are more likely to report their depression symptoms. These findings are in contrast to a previous study, who did not find a relationship between perceived supportive DC and depression or anxiety. The significant partner effect from perceived supportive DC of patients and anxiety symptoms of spouses could imply the association of patients perceiving more supportive behavior from the spouse when spouse is feeling more worries about the patient and thus provide more support.

Perceived negative dyadic coping. Patient's and spouse's perceived negative DC were positively associated with their own depressive and anxiety symptoms. This suggests that more perceived negative DC from the other (e.g., get allegations) was associated with severe levels of depression and anxiety symptoms, but only for oneself (no significant partner effects). This is in line with previous studies with other cancer types as well as with the strong association of perceived negative DC with supportive care needs of patients and spouses.

Perceived delegated dyadic coping. Patients perceiving more delegated DC from the spouse were associated with feeling more depression symptoms in patients. This might be due to patients see how many tasks spouses were taking over and therefore feel more helpless.

Perceived social support. Regarding PSS, there was a consistent association: more PSS was related to less depression and anxiety symptoms in patients and spouses (actor effects). This finding is in line with previous research in different cancer populations and their caregivers. It is to highlight that more spouse's PSS is also associated with less patient's depression symptoms (partner effect). It might be that patients experience stress from burdening their spouses with the disease, and therefore, feel less distressed when they see the spouse is receiving support for themselves. A similar effect was found in a study with breast cancer patients, where family support received by spouses has a negative association with anxiety.
and global distress of the patient. Moreover, there is recent research which identified that PSS only buffers against depressive and anxiety symptoms if the support is explicitly wanted from cancer patients. This should be considered in further research. Since another recent study found only partner associations between PSS and patient/caregiver health in lung cancer dyads but not in colorectal cancer dyads, it should be considered to evaluate analyses separately for the diverse hematological cancer types in subsequent studies.

In summary, first we found differences in the level of PDC (except common DC) and PSS in hematocological patients and their spouses, but they show similar levels of depression and anxiety symptoms. Second, perceived negative DC was associated with more depression and anxiety symptoms in both and perceived positive DC with more depression symptoms in both and more anxiety symptoms in spouses. Third, PSS of patients and spouses shows a consistent picture in direction of the buffering effect. Finally, more partner effects from spouses were significant, which emphasizes the influence of spouses on the patients.

### 4.1 Study limitations

Some limitations need to be taken into consideration. Since our variables were measured via self-report survey at home, there is uncertainty about a potential social desirability bias and whether the instruction to fill out the questionnaire alone was followed. Furthermore, the cross-sectional design of the study limits conclusions about causality relationships between PDC and PSS with psychological distress. Assessment of depression and anxiety symptoms with the PHQ-4 can be critical despite adequate internal consistency of the questionnaire because the brief form might not cover all dimensions of distress. In addition, assessment of PSS can be viewed critically, as we cannot definitely determine whether participants only considering other family and friend support than the spouse in the questionnaire. Moreover, discussing our findings in relation to previous research is challenging. First, because PDC scores are rarely used in cancer samples to date and second, because this is the first study measuring PDC and PSS in hematological cancer patients and their spouses and comparability with other cancer types is not clear. Nevertheless, the overall large sample size and common investigation of hematological cancer patients and their spouses with consideration of the existent nonindependence were major strength of the present study.

### 4.2 Clinical implication

Cancer burdens hematological patients and spouses to a comparable extent. Both depression and anxiety symptoms of patients and spouses were related to PDC and PSS. Interventions for
hematological couples should draw couples’ attention to the strong association between perceived negative DC as well as perceived supportive DC and psychological distress. It has already been assumed that interventions focusing on negative DC behavior could be more beneficial for couples. Since PSS of the spouse was beneficial for both spouses and patients, spouses should be brought more into focus for receiving support. Interventions could highlight the importance of PSS for spouses and encourage spouses to increase their search for support, because this can be also indirectly beneficial for patients.

5 | CONCLUSION

Hematological cancer patients and their spouses use different forms of support to cope with cancer and the associated psychological distress. Overall more attention should be paid on the PDC, since for example PDC was found to be stronger predictor for relationship distress. Overall more attention should be paid on the PDC, since for example PDC was found to be stronger predictor for relationship distress. In order to gain a deeper insight of the interplay of support, future research should examine all different forms of support collectively in cancer population. Furthermore, enhancement of PSS should be focused, as PSS is beneficial for both patients and spouses.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

Data are only available from the corresponding author on request, because of privacy or ethical restrictions.

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SUPPORTING INFORMATION
Additional supporting information may be found online in the Supporting Information section at the end of this article.

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