

Personal and Organizational Antecedents of Employees' Stress:  
Differential Analyses of the Work-Family Interplay

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## I. Summary

The integration of work and family domains is an important topic in our society, politics and economy, and researchers and practitioners of diverse disciplines deal with it. In the field of psychology as well as business and social sciences, one of the most relevant questions is how employees stay healthy. This challenge is especially interesting with regard to organizations as absenteeism rates and medical expenses may thus be reduced. In the light of changing work- and life-environments, the answer to this question has to be verified anew on a regular basis and improved by actual insights. The conflict between work and family roles has been identified as a key cause for the experience of stress in existing literature of the recent decades. Conflicts occur if both domains compete for resources such as time or energy. Thus, if one domain consumes resources that would be needed in the other domain, the domains interfere with each other. This interference can be caused internally or externally. For example, work can interfere with family life internally if people cannot stop thinking about work-related problems while being at home and caring for children. An external interference takes place if someone has to work overtime and is therefore late for familiar occasions. Both these types are named work-family conflict (WFC). WFC has gained the most research attention in contrast to other variables of the work-family interplay. Nevertheless, there are some research questions that have not been answered yet. Three of these research gaps will be closed each by one of the three studies of this dissertation.

Firstly, despite the extensive research engagement it is still unclear what impact WFC has with regard to other classic stressors of occupational health models. Closing this research gap is important for giving evidence-based recommendations on whether WFC should be included into workplace health promotion or whether classic stressors still have greater impact on employees' health. Therefore, the first study aims at answering *Research Question 1: What influences do variables of a classic occupational health theory have in the context of WFC and stress?*

Secondly, in times of demographic changes more and more employed people have to care not only for their children but also for their parents. In research as well as organizational practice this topic has gained more attention by now. However, it is still unclear whether the established relational patterns between WFC and stress that apply to

samples with childcare responsibilities are also reliable in a sample of employees with informal family caregiver responsibilities. Moreover, the second study investigates which resources could support the challenge of integrating work as well as caregiving roles successfully while staying healthy. Therefore, Study II aims at answering *Research Question 2: What are important resources for employed informal family caregivers when confronted with different types of WFC and stress?*

Thirdly, existing work-family research utilizes subjective indicators in order to determine whether people experience stress or not. Medical as well as psychophysiological research has shown that cortisol is a stress hormone that is a reliable stress indicator. To the author's knowledge, no study exists that investigates whether the experience of WFC is even related to the cortisol level as a biomarker of stress. If this was the case, this would underpin the relevance of WFC as a crucial stressor that should not be underestimated regarding the extent of its impact. Beyond conflicts, people who have multiple roles in the work and the family domain also experience enrichment due to these roles. Inter alia, these positive as well as negative aspects decide on whether people have the general feeling that they are able to fulfill the expectations of relevant role-related partners. This is named work-family balance. Even this experience has not been investigated with regard to the cortisol level. Therefore, Study III aims at answering *Research Question 3: Do different types of WFC as well as work-family balance have an impact on a biomarker of stress such as cortisol?*

On the basis of these three studies, a comprehensive theory- and evidence-based model will be developed theoretically on the basis of conservation of resources theory, which enlarges existing research and identifies important starting points for organizational practice. Thereby, two overall aims will be reached by this dissertation:

*Overall Aim (1): Identification of personal and organizational antecedents that are important predictors regarding internal and external WFC and stress and*

*Overall Aim (2): Detection of differences in the association between different types of WFC and different stress indicators.*

Initially, the three studies, which are the core of this dissertation, will be summarized as follows:

The aim of *Study I* was to identify the impact of the variables from a classic occupational mental health model within the context of WFC and stress in order to identify the relevance of WFC for workplace health promotion. One of the most important mental health models is the effort-reward imbalance (ERI) model. In contrast to others, this model includes, beyond the characteristics of work (effort and reward), also a specific characteristic of the employee (overcommitment). Overcommitment means that someone is overly committed to his/her work, which could be quite relevant for the experience of WFC. Thus, to extend previous research, it was tested whether internal and external WFCs act as mediators between the three ERI aspects separately (effort, reward, and overcommitment) and irritation in one model. Irritation was investigated as the dependent variable, because this is a stress indicator which can be located between acute and chronic stress, which is useful as a screening indicator for prevention activities and the resulting scores are comparable to norm scores. Based on a heterogeneous sample of 627 employees, results indicate good model fit and confirm overcommitment as a crucial predictor for internal WFC and irritation. Additionally, internal WFC was decisively related to irritation. The combination of high ERI and high overcommitment was related to both increased WFC and irritation. Overall, the results of the present study provide a more detailed understanding of the WFC process and its consequences for mental health. Considering the results, in contrast to classic stressors internal WFC was a strong predictor for employees' stress. Moreover, overcommitment played a crucial role regarding this relationship. Therefore, these topics should be further integrated by research as well as practice in order to find common solutions.

Work-family research and practice concentrate on childcare responsibilities and hence neglect an increasing population of employees who care for dependents such as elders, impaired partners or disabled children. Therefore, the aim of *Study II* was to investigate a theory-based model that integrates organizational and personal resources as antecedents of WFC and irritation in an employed family caregiver sample. Moreover, the mediating effects of internal and external WFC on the relation between these resources and irritation were investigated. As described above, it is mostly assumed that WFC increase stress, but there are initial results that stress increases WFC, too. Therefore, reciprocal effects between WFC and irritation were analyzed additionally. In this study, data of 508 employees with informal family caregiving

responsibilities of one organization were studied. Results showed that the basic model fitted well in this population. Work-family culture was an important resource for reducing WFC and health-related self-efficacy was a beneficial resource in reducing irritation. Furthermore, reciprocal effects between internal and external WFC and irritation were found. In sum, a family-friendly culture that deals with its employees who have informal family caregiver responsibilities in a constructive and understanding manner makes for them it easier to integrate work and family demands with each other. Moreover, health-related self-efficacy is an important resource that can improve stress as well work-family experiences and should therefore find more consideration in the future.

Within *Study III*, the personal resource resilience, which is the psychological resistance that enables people to develop even under bad circumstances, was investigated as a predictor of both WFC and balance, and a physiological predictor of stress. Thus, for the first time to the author's knowledge, the objective of the presented study was to assess whether work-family interplay and resilience are associated with an objective biomarker of stress, namely cortisol. Participants of the study were 35 employed parents with children up to the age of six. Salivary cortisol was collected at three points on one day. Results showed that internal as well as external WFCs were related to the mean cortisol level, but also that work-family balance was not significantly associated with cortisol. Resilience had a beneficial influence on the mean cortisol level. Moreover, resilience was also advantageous for the experience of work-family balance. Therefore, it was concluded that WFC and resilience were indeed related to cortisol secretion, which should be validated further by future research. Furthermore, resilience seems to be crucial for work-family balance. Thus, this study shows important insights for future research.

To sum up the answers to the specific research questions, it can be concluded that firstly, especially internal WFC was strongly associated with irritation and that overcommitment plays a crucial role for the experiences of irritation and internal WFC. Secondly, regarding the employed family caregiver sample, primary work-family culture was an important resource in the prevention of internal as well as external WFC, and health-related self-efficacy was associated with decreased irritation. Thirdly, internal and external WFC were associated with the mean cortisol secretion whereas



resilience was a resource related to decreased cortisol levels and an increased work-family balance.

With regard to the overall research aims of this dissertation it can be concluded that firstly, work-family culture and overcommitment are important predictors for internal as well as external WFC whereas resilience predicts work-family balance. Additionally, WFC plays a crucial role in relation to subjective as well as objective stress indicators with regard to direct, mediational as well as reciprocal relationships. Secondly, internal WFC predicts stress outcomes more strongly than external WFC and both conflict types have a different impact on the cortisol level.

In sum, this dissertation highlights the importance of relevant but commonly seldom investigated key aspects of the relationship between work-family interplay and stress such as overcommitment, work-family culture, health-related self-efficacy and resilience. Thereby, significant starting points for theory- and evidence-based workplace health promotion were identified.

## II. Zusammenfassung

Die Vereinbarkeit von Beruf und Familie ist ein wichtiges Thema in unserer Gesellschaft, Politik und Wirtschaft, mit dem sich Wissenschaftler und Praktiker verschiedenster Disziplinen auseinandersetzen. Im Rahmen der Psychologie wie auch der Wirtschafts- und Sozialwissenschaften ist eine der relevantesten Fragen, wie Erwerbstätige möglichst gesund bleiben. Für Unternehmen ist diese Fragestellung besonders interessant, um Fehlzeiten und Krankheitskosten entgegenwirken zu können. Die Antwort auf diese Frage muss vor dem Hintergrund sich verändernder Arbeits- und Lebenswelten regelmäßig neu überprüft und durch aktuelle Erkenntnisse verbessert werden. In der Literatur der letzten Jahrzehnte wurde immer wieder das Erleben von Konflikten zwischen beruflichen und familiären Rollen als zentrale Ursache für das Erleben von Stress identifiziert. Konflikterleben tritt dann auf, wenn beide Lebensbereiche um Ressourcen wie Zeit und Energie konkurrieren. Das heißt, wenn ein Bereich Ressourcen verbraucht, die in dem anderen Bereich benötigt würden, beeinträchtigen sich die Bereiche gegenseitig. Diese Beeinträchtigung kann internal oder external verursacht sein. Beispielsweise stört das Arbeits- das Familienleben internal, wenn jemand nicht aufhören kann, über berufliche Probleme nachzudenken, während er/sie sich zu Hause befindet und sich um die Kinder kümmert. Eine externe Beeinträchtigung ist es, wenn jemand bei der Arbeit Überstunden machen muss und aufgrund dessen zu spät zu familiären Anlässen erscheint. Diese beiden Typen von Konflikterleben werden Beruf-Familie Konflikt (work-family conflict, WFC) genannt. Obwohl der WFC in der Forschung im Vergleich zu anderen Variablen des Beruf-Familie Zusammenspiels die meiste Aufmerksamkeit erlangt hat, bleiben einige Forschungsfragen offen, von denen die folgenden drei durch jeweils eine Studie dieser Dissertation beantwortet werden.

Erstens bleibt trotz des intensiven Forschungsengagements unklar, welche Wirkung WFC im Vergleich zu anderen klassischen Stressoren berufsbezogener Gesundheitsmodelle hat. Im Rahmen des betrieblichen Gesundheitsmanagements (BGM) wäre es wichtig zu wissen, ob neue Konzepte des BGM den WFC berücksichtigen sollten oder ob klassische Stressoren doch nach wie vor einen größeren Einfluss auf die Mitarbeitergesundheit haben. Deshalb ist das Ziel der ersten Studie die

*Forschungsfrage (1): Welchen Einfluss haben Variablen eines klassischen berufsbezogenen Gesundheitsmodells im Kontext von WFC und Stress?* zu beantworten.

Zweitens müssen in Zeiten des demografischen Wandels immer mehr erwerbstätige Menschen nicht nur für ihre Kinder sondern auch für ihre Eltern Sorge tragen. In der Forschung sowie in der organisationalen Praxis bekommt dieses Thema inzwischen mehr Aufmerksamkeit. Allerdings ist noch unklar, ob die etablierten Zusammenhänge zwischen WFC und Stress gültig sind, wenn, im Gegensatz zu den bisherigen Stichproben von Erwerbstätigen mit Kindern, eine Stichprobe von Erwerbstätigen mit pflegebedürftigen Angehörigen untersucht wird. Außerdem soll in der zweiten Studie untersucht werden, welche Ressourcen die Herausforderung der Vereinbarkeit von Beruf und Pflege sowie die Gesunderhaltung der pflegenden Erwerbstätigen unterstützen können. Daher soll Studie II die *Forschungsfrage (2): Was sind wichtige Ressourcen für Erwerbstätige mit pflegebedürftigen Angehörigen, die mit verschiedenen Typen von WFC und Stress konfrontiert sind?* beantworten.

Drittens nutzt die bisherige Beruf-Familie Forschung meistens subjektive Indikatoren, um zu bestimmen, ob Menschen Stress erleben. Aus der medizinischen bzw. psycho-physiologischen Forschung ist das Stress-Hormon Cortisol bekannt, welches einen objektiven Indikator von Stress darstellt. Nach Wissen der Autorin existiert keine Studie, die untersucht, ob das Erleben von WFC sogar in Zusammenhang mit dem Cortisol-Level als Biomarker von Stress steht. Wenn das der Fall wäre, würde dies die Relevanz von WFC als entscheidenden Stressor, der nicht in seiner Wirkungsreichweite unterschätzt werden sollte, unterstreichen. Außerdem erleben Personen, die berufliche und familiäre Rollen ausfüllen, nicht nur Konflikte aufgrund dieser Rollen, sondern auch Bereicherung. Unter anderem aus diesen positiven und negativen Erlebensqualitäten bilden sie sich ein Urteil darüber, ob sie insgesamt das Gefühl haben, den Erwartungen von rollen-relevanten Partnern zu entsprechen. Dies wird als Beruf-Familie Balance bezeichnet. Auch dieses Erleben wurde bisher noch nie in Bezug zum mittleren Cortisol-Level untersucht. Deshalb soll die dritte Studie die *Forschungsfrage (3): Haben verschiedene WFC-Typen und Beruf-Familie Balance einen Einfluss auf einen Biomarker von Stress wie Cortisol?* beantworten.

Durch diese drei Studien wird ein umfassendes theorie- und evidenzbasiertes Modell auf der theoretische Basis der „Conservation of Resources“ Theorie entwickelt, welches die bestehende Forschung erweitert und wichtige Ansatzpunkt für die betriebliche Praxis identifiziert. Somit sollen insgesamt zwei übergeordnete Ziele mit dieser Dissertation erreicht werden:

*Gesamtziel 1: Identifikation von personalen und organisationalen Antezedenzien, welche wichtige Prädiktoren bezüglich internalem und externalem WFC sowie Stress sind und*

*Gesamtziel 2: Feststellung von Unterschieden in den Zusammenhängen zwischen verschiedenen WFC-Typen und verschiedenen Stressindikatoren.*

Zunächst werden die drei Studien, die den Kern dieser Dissertation darstellen, kurz wie folgt zusammengefasst:

Das Ziel von *Studie I* war es, den Einfluss von Variablen eines klassischen berufsbezogenen Gesundheitsmodells im Kontext von WFC und Stress zu bestimmen, um so die Bedeutsamkeit von WFC für das BGM abschätzen zu können. Eines der prominentesten allgemeinen Gesundheitsmodelle ist das „Effort-Reward Imbalance“ (ERI) Modell. Dieses wurde für die erste Studie ausgewählt, da es im Unterschied zu anderen klassischen Modellen neben Eigenschaften der Arbeit (Aufwand und Belohnung) auch eine spezifische Eigenschaft der Arbeitnehmer (Overcommitment) berücksichtigt. Unter Overcommitment versteht man die übermäßige Verbundenheit mit der eigenen Arbeit, die für das Erleben von WFC durchaus relevant sein kann. Um die bisherige Forschung zu erweitern, wurde daher überprüft, ob internaler und externaler WFC als vermittelnde Variablen (Mediatoren) zwischen den drei ERI-Variablen (Aufwand, Belohnung und Overcommitment) und Irritation in einem Modell fungieren. Irritation wurde als abhängige Variable untersucht, weil dies ein Stress-Indikator im Bereich zwischen akutem und chronischem Stress ist, der sich gut als Screening-Indikator für Präventionen eignet und dessen Werte mit Normwerten vergleichbar sind. Basierend auf einer heterogenen Stichprobe von 627 Erwerbstätigen zeigten die Ergebnisse einen guten Modell-Fit und bestätigten Overcommitment als einflussreichen Prädiktor für den internalen WFC und Irritation. Zudem hing der interne WFC maßgeblich mit Irritation zusammen. Die Kombination eines großen Ungleichgewichts

von Aufwand und Belohnung und hohem Overcommitment stand in Beziehung zu erhöhtem WFC und Irritation. Insgesamt lieferten die Ergebnisse ein detaillierteres Verständnis des WFCs und seiner gesundheitsbezogenen Konsequenzen. Es konnte das Fazit gezogen werden, dass im Vergleich zu klassischen Stressoren das interne Konflikterleben sehr eng mit dem Stresserleben von Erwerbstätigen verknüpft ist. Zudem spielt die übermäßige Bindung an die Arbeit in diesem Zusammenhang eine ausschlaggebende Rolle. Daher erscheint es sinnvoll, diese Themen sowohl in der Forschung als auch in der Praxis stärker zu integrieren und gemeinsame Lösungsstrategien zu finden.

Die Beruf-Familie Forschung sowie Praxis konzentrierte sich bisher auf die Verantwortung von Erwerbstätigen für Kinder und vernachlässigte daher eine zunehmende Population von Erwerbstätigen, die sich um Angehörige wie beispielsweise Eltern, gesundheitlich beeinträchtigte Partner oder Kinder mit Behinderung kümmern. Deshalb war das Ziel der *Studie II* ein theorie-basiertes Modell, welches organisationale und personale Ressourcen als Antezedenzen von WFC und Irritation integriert, innerhalb einer Stichprobe von Erwerbstätigen mit pflegebedürftigen Angehörigen zu untersuchen. Außerdem wurden vermittelnde Effekt von internalem und externalem WFC auf den Zusammenhang zwischen diesen Ressourcen und Irritation analysiert. Wie beschrieben wird meistens davon ausgegangen, dass das Konflikterleben den Stress erhöht. Allerdings gibt es erste Befunde, dass auch das Erleben von Stress dazu führt, dass Menschen mehr Konflikte erleben. Daher wurden zusätzlich reziproke Effekte zwischen WFC und Irritation untersucht. In dieser Querschnitts-Studie wurden die Daten von 508 Erwerbstätigen mit Verantwortung für pflegebedürftige Angehörige ausgewertet. Die Ergebnisse zeigten, dass das Grundmodell einen guten Fit in dieser Population aufwies. Die familienbewusste Unternehmenskultur war eine wichtige Ressource, um das Erleben von WFC zu reduzieren, und die gesundheitsbezogene Selbstwirksamkeit war eine förderliche Ressource zur Reduzierung von Irritation. Des Weiteren wurden reziproke Effekte zwischen internalem und externalem WFC und Irritation gefunden. Insgesamt kann geschlussfolgert werden, dass eine familienbewusste Unternehmenskultur, die konstruktiv und verständnisvoll mit den Belangen von Mitarbeitern mit pflegebedürftigen Angehörigen umgeht, für diese Zielgruppe sehr hilfreich bezüglich

der besseren Vereinbarkeit von Beruf und Familie ist. Darüber hinaus dient die gesundheitsbezogene Selbstwirksamkeit als wichtige Ressource, die sowohl das Stresserleben als auch das Vereinbarkeitserleben verbessern kann und daher stärkere Berücksichtigung finden sollte.

In *Studie III* wurde als weitere personale Ressource Resilienz, also die psychische Widerstandskraft eines Menschen, sich auch unter widrigen Umständen weiterzuentwickeln, als Prädiktor von sowohl Beruf-Familie Konflikt als auch Balance sowie als Prädiktor eines Stressindikators untersucht. Zudem, und nach Wissen der Autorin zum ersten Mal, war das Ziel der dritten Studie, zu untersuchen, ob das Zusammenspiel von Beruf und Familie sowie Resilienz mit einem objektiven Biomarker von Stress, nämlich Cortisol, in Verbindung stehen. Die Teilnehmer dieser Studie waren 35 erwerbstätige Eltern, die Kinder im Alter von unter 6 Jahren hatten. Cortisol im Speichel wurde jeweils zu drei Zeitpunkten an einem Tag erhoben. Die Ergebnisse zeigten, dass sowohl internaler als auch externaler WFC in Beziehung zum mittleren Cortisol-Level standen, allerdings die Beruf-Familie Balance keine signifikante Beziehung zum Cortisol-Level aufwies. Resilienz hatte einen förderlichen Einfluss auf das Ausmaß der Cortisol-Sekretion. Darüber hinaus war Resilienz auch vorteilhaft für das Erleben von Beruf-Familie Balance. Daher konnte das Fazit gezogen werden, dass das Konflikterleben und Resilienz tatsächlich in Zusammenhang mit der mittleren Cortisol-Sekretion standen, was durch weitere Forschung allerdings gefestigt werden sollte. Außerdem scheint Resilienz sehr wichtig für das Erleben von Beruf-Familie Balance zu sein. Somit gibt diese Studie relevante Hinweise für die zukünftige Forschung.

Um die oben genannten Forschungsfragen insgesamt zu beantworten, kann gefolgert werden, dass erstens vor allem der interne WFC in einem starken Bezug zu Irritation steht und dass Overcommitment eine entscheidende Rolle für das Erleben von Irritation sowie internalem WFC spielt. Zweitens ist insbesondere die familienbewusste Unternehmenskultur in der Stichprobe der Erwerbstätigen mit pflegebedürftigen Angehörigen eine wichtige Ressource für die Prävention von sowohl internalem als auch externalem WFC. Zudem ist in dieser Stichprobe die gesundheitsbezogene Selbstwirksamkeit mit geringerer Irritation verbunden. Außerdem beeinflussen sich WFC und Irritation wechselseitig. Drittens stehen sowohl internaler als auch externaler

WFC und Resilienz in Zusammenhang mit der mittleren Cortisol-Ausschüttung, wohingegen WFB keinen Einfluss darauf hat.

In Bezug auf die Gesamtziele der Dissertation kann festgehalten werden, dass erstens eine familienbewusste Unternehmenskultur und Overcommitment wichtige Prädiktoren für sowohl den internalen als auch den externalen WFC sind, wohingegen Resilienz mit Beruf-Familie Balance zusammenhängt. Zudem spielt der WFC eine entscheidende Rolle im Zusammenhang mit subjektiven wie auch objektiven Stressindikatoren in Bezug auf direkte, mediierende sowie reziproke Beziehungen. Zweitens zeigt internaler WFC einen stärkeren Zusammenhang zu Irritation auf als externaler WFC und beide Konflikt-Typen haben einen unterschiedlichen Einfluss auf das Cortisol-Level.

Insgesamt verdeutlicht diese Dissertation die Bedeutung von relevanten - aber bisher selten gemeinsam untersuchten - Schlüsselvariablen wie Overcommitment, familienbewusster Unternehmenskultur, gesundheitsbezogener Selbstwirksamkeit und Resilienz für die Beziehung des Zusammenspiels von Beruf und Familie mit Stress. Dadurch wird die bestehende Literatur erweitert und es werden signifikante Ausgangspunkte für ein theorie- und evidenzbasiertes betriebliches Gesundheitsmanagement identifiziert.

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## V. List of Abbreviations

AGFI	adjusted goodness-of-fit
AVE	average variance extracted
$\beta$	beta-coefficient
BMI	body mass index
cf.	confer / compare
CFI	comparative fit index
COR	conservation of resources
$\Delta$	delta
DC	demand control
df	degrees of freedom
e.g.	exempli gratia / for example
ERI	effort-reward imbalance
et al.	et alia
$\eta^2$	effect size for analysis of variance
F	statistic for significance of multivariate model
FWC	family-work conflict
GFI	goodness-of-fit
HPA	hypothalamic-pituitary-adrenocortical
HR	human resources
ICD-10	international classification of mental and behavioral disorders - 10
i.e.	that is
M	mean
MANOVA	multivariate analysis of variance
ML	maximum likelihood
N	sample size
n	size of subsample
NFI	normed fit index
ns	not significant
OC	overcommitment
p	level of significance

p.	page
PLS	partial least square
POS	perceived organizational support
r	correlation
$\rho$	corrected correlation
R <sup>2</sup>	squared multiple correlation coefficient
RMSEA	root mean square error of approximation
SD	standard deviation
SEM	structural equation modeling
SRMR	standardized root mean square residual
t	test statistic for Student-t-distributed data
TLI	Tucker-Lewis-Index
WFB	work-family balance
WFC	work-family conflict
WHO	World Health Organization
$\chi^2$	chi square coefficient

# 1. Introduction

*“Learning how to think” really means learning how to exercise some control over how and what you think. It means being conscious and aware enough to choose what you pay attention to and to choose how you construct meaning of experience.*

*David Foster Wallace (2012, p. 47)*

In his college speech, David Foster Wallace (2012) reminded us of how important it is to pause for a moment and reflect in order to not “get lost in abstract thinking instead of simply paying attention to what’s going on in front of [us]. Instead of paying attention to what’s going on *inside* [us]” (p. 47). Are we doing this as individuals, as organizations as well as societies?

Work and family are the two domains many people pay most attention to during their waking hours. But do they really concentrate on what happens in front of them in either the work or the family domain? Inside of them, work and family roles meet or compete with each other. Do people consciously choose how much attention they will pay to each domain? Do they realize and reflect the interplay of both domains? What do they know about consequences of the work-family interplay? Which aspect of this interplay is really stressful for them? Do they know any resources that will be necessary to successfully integrate work and family domains? And do we care for our resources, for the work-family interplay and for ourselves? Do we pay attention to any of these questions in our daily routine?

Most researchers agree that we can experience positive as well as negative emotions in each domain. What is really challenging for many people is to satisfactorily integrate both domains with each other in one’s own life. This is a life-long process with the aim of maximizing the quality of living in both domains (Kastner, 2010). The question is whether people really pay attention to both domains as well as their integration or whether they have no time to take a pause for reflection and therefore, hope that everything will turn out beneficial for them. Moreover, do we have a feeling of having control over our work-family interplay or do we feel that it is fully externally controlled?

The integration of work and family roles has become more difficult due to constant changes, workplace insecurity, increased mobility, small family sizes as well as changing life-claims (cf. Kastner, 2010; Resch & Bamberg, 2005). Therefore, during this enduring procedure of work-family integration, many people experience that their work and family roles are mutually incompatible with each other (Greenhaus & Beutell, 1985). Thus, they experience work-family conflict inside of them. Regarding organizational consequences, work-family conflict is negatively related to organizational citizenship behavior, work satisfaction and organizational commitment and positively related with intention to turnover (Amstad, Meier, Fasel, Elfering, & Semmer, 2011). With regard to individual consequences, recent literature has shown that work-family conflict is negatively related to life satisfaction and positively associated with different serious health outcomes such as stress, depression and anxiety (Amstad et al., 2011). In times of an increasing number of mental disorders (Badura, Ducki, Schröder, Klose, & Macco, 2011), this should give any individual as well as any organization every reason to pay more attention to the interface of work-family interplay and stress.

According to Kastner (2010), health-impaired extreme jobbers were not able to exactly define what has made them sick, but, while they were healthy, they felt that they had lost control over their own lives. Beyond the aspect of paying attention to life domains, this seems to be another important aspect regarding work-family integration. Having control over one's own work-family interplay and stress experiences does not mean to have the control over everything but to find the right extent of internal control, which is based on conscious decisions of the individual. Furthermore, it means to consciously assume responsibility and to know where we - the individual as well as the organization - can change something when we experience that things are not turning out beneficially by chance.

Therefore, this dissertation will investigate which aspects of the work-family interplay-stress process are worth to pay attention to. For that reason, three different viewpoints will be considered that have been neglected in existing research. Thus, this dissertation will focus firstly on the viewpoint of theoretical model development and integration, secondly on the viewpoint of a specific sample with a special work-family challenge as well as thirdly on the viewpoint of measurement specifics. These

viewpoints will answer the questions of (1) which aspects of classical mental health models should be paid attention to in the work-family-stress relationship, (2) what should be taken notice of beyond employed mothers caring for their children and (3) whether we should engage for a reduction of work-family conflict more strongly because it might even have impact on our hormone stress reactions. Thus, by means of three studies, the work-family interplay will be investigated in the spotlight of (1) a classic mental health model, (2) the sample of employees with informal caregiving responsibilities and (3) cortisol secretion as a biomarker of stress. Therefore, more awareness of and detailed insights into the work-family interplay in relation to health-related consequences will be gained.

The results of these three studies will enable proposals about organizational and personal antecedents for which it is worthwhile for individuals as well as organizations to make a pause in their daily routine and decide whether they want to pay attention to them and have some degree of control over them.

## **1.1 Goals of the Dissertation and Research Questions**

The overall goal of this study is to validate a model that explains the relationship between personal and organizational antecedents, work-family interplay and employees' stress and that is theory-based and practically relevant. Beyond the model validation this dissertation includes three specific study goals which contribute to the existent literature in several ways: The first goal is to integrate work-family interplay into the comprehensive model with regard to a general occupational health model of stress. The second goal is to investigate the specific and growing target group of employees who have informal family care responsibilities and to identify beneficial resources. The third goal is to validate the relationship between work-family interplay and stress using an objective stress indicator. These three goals will be described more concretely in the following. For a really detailed description of the theoretical and practical need for answering these questions see the study chapters 3-5.

Work-family interplay has become a major challenge for many employees. To date, the vast majority of research results show that work-family conflict (WFC) can have serious health consequences (Amstad et al., 2011). Therefore, WFC is such an

important and influential stressor that it should be integrated in general mental health models as well as HRs' workplace health promotion activities.

Classic as well as prominent stress models of occupational health psychology such as effort-reward imbalance (ERI) theory (Siegrist, 1996), demand-control theory (Karasek, 1979), and Job Demands-Resources model (Bakker & Demerouti, 2007; Demerouti, Nachreiner, Bakker, & Schaufeli, 2001) did not include work-family interplay explicitly in their conceptualizations. This makes it necessary to investigate what impact WFC has on stress reactions with regard to classic stressors. To date, three studies have begun to integrate WFC into the ERI framework (see Franche et al., 2006; Kinman & Jones, 2008; Willis, O'Connor, & Smith, 2008). All of them neglected the personal variable overcommitment, which might be crucial regarding the interference of work in the family domain. The excessive commitment to work should lead to stronger experiences of work demands interfering with family demands and therefore, this should increase the individual's stress level. Moreover, the existing studies did not analyze the influence effort and reward itself – not in interaction – have on the work-family interface. Therefore, Study I aims at integrating effort-reward imbalance theory and WFC in a comprehensive model of stress and will answer Research Question 1 of this dissertation:

*Research Question 1: What influences do variables of a classic occupational health theory have in the context of WFC and stress?*

Thus, the contribution of Study I to existent theories and practical recommendations is that the relative impact of work-family interplay, in contrast to classic stressors (effort, reward and overcommitment), can be estimated. Additionally, in contrast to the classic interaction approach regarding the coactions of efforts and rewards (effort\*reward), in this study the coactions of effort-reward imbalance and overcommitment (effort-reward-imbalance\*overcommitment) will be analyzed (cf. van Vegchel, de Jonge, Bosma, & Schaufeli, 2005), namely in the manner that different types will be investigated. This new approach will gain insight into the effects of such combination types with regard to WFC and stress. Thereby, more evidence-based detailed ideas regarding prevention activities are resulting.

In times of demographic changes the number of elders in our society rises proportionally more strongly than younger people follow. Due to that change, more people have to integrate work as well as informal caregiving roles (Zacher, Jimmieson,

& Winter, 2012). Therefore, a shift in human resources (HR) practitioners' focus occurs: It is well established to offer employees assistance with childcare while initiatives regarding elder care are lacking. Today, HR practitioners in organizations are beginning to engage in ensuring a better elder care support, but there is little empirical evidence about important starting points. A similar change can be observed in the existing research engagement, whose attention, which has mostly been on mothers who care for children, now begins to shift to male as well as female employees providing informal family care to impaired relatives, who have often been neglected in research so far.

Remarkably, this target group - due to the often unexpected confrontation with impairment of a loved one and reversed role patterns such as caring for elders – experiences more health problems such as depression than non-caregivers (Ho, Chan, Woo, Chong, & Sham, 2009; Pinquart & Sörensen, 2003). For the individual, the maintenance of employment in addition to the caregiving challenge is difficult but beneficial in the sense of experiencing positive feelings, social support and distraction. For the company, the maintenance of a good mental health status of the employed caregiver is important for the ensurance of work performance (Zacher et al., 2012). Therefore, the question is which personal and organizational resources are beneficial for the experience of lower WFC and lower stress in the case of employees with informal family caregiving responsibilities. Moreover, in this sample it will be investigated whether there are reciprocal effects of the different WFC types and stress. Thus, to extend previous literature of organizational psychology and to give evidence-based recommendations for workplace health promotion, the second research question should be answered by Study II:

*Research Question 2: What are important resources for employed informal family caregivers when confronted with different types of WFC and stress?*

Moreover, existing research has shown that different aspects of the work-family interplay can have negative as well as positive effects on well-being (Mullen, Kelley, & Kelloway, 2008). Therefore, Study III aims at integrating negative (WFC) and positive (work-family balance) experiences in the model predicting stress simultaneously. A lot of research in the work-family domain operationalized stress with different self-reported and therefore subjective indicators. To estimate the impact the work-family interplay



has on employees' health, it is additionally necessary to examine the influence the different work-family variables have on physiological health indicators. To the author's knowledge, this study is the first that investigates whether positive as well as negative work-family interplay is associated with cortisol as a biomarker of stress. Cortisol is the main stress hormone and is related to severe diseases (cf. Lundberg, 2011). Moreover, through this investigation a differential consideration of the separate impacts of different types of WFC as well as the overall evaluation of balance is possible. This analysis gives a first hint at the scope that work-family interplay has on mental health. Thus, by conducting Study III, the following question should be examined:

*Research Question 3: Do different types of WFC as well as work-family balance have an impact on a biomarker of stress such as cortisol?*

While answering these research questions with these three studies, this dissertation combines different research scopes of psychology, economics, family, demography and aging as well as physiology. Moreover, by means of investigating these specific questions, the overall aim of this dissertation is the validation of a comprehensive model which provides a framework for the relationship of work-family interplay and stress for further research as well as HR practitioners. In order to identify key aspects that might be important for situational as well as personal prevention activities of the workplace health promotion, different antecedents will be investigated. Moreover, for a deeper insight into the interlinking mechanisms, different types of WFC will be analyzed to enable goal-oriented and evidence-based intervention designs. Therefore, due to the three studies the following two dissertation's overall aims can be reached:

*Overall Aim (1): Identification of personal and organizational antecedents that are important predictors regarding internal and external WFC and stress.*

*Overall Aim (2): Detection of differences in the association between different types of WFC and different stress indicators.*

In the following section the outline of the dissertation will be described.

## 1.2 Outline of the Dissertation

The aim of this dissertation is to get deeper insights into the relationship between work-family interplay and stress as well as important personal and organizational antecedents. Therefore, three empirical studies are conducted, which are the centerpiece of this dissertation and answer the dissertation's specific research questions. To reach the specific and the overall aims as described above, this dissertation is structured as follows:

First, in *Chapter 2*, the theoretical framework of the dissertation's overall research model is described. This section is essential for the overall discussion of all three studies, because the core and common ground of each of the three studies is WFC, which is explained in this dissertation by diverse viewpoints. In order to answer all specific research questions, each study uses different antecedents and different stress consequences. Therefore, the development of the comprehensive overall research model, which is used to explain the relationship between work-family interplay and stress in general, is needed. For that reason, work-family interplay as well as stress are defined. Then the relationship between work-family interplay and stress is described by means of a general stress theory, which is domain-independent and therefore appropriate for the explanation of stress processes of the work-family interface. Moreover, this theory is used for theoretical derivation and underpinning of the dissertation's research model in contrast to a model which is discussed in literature but has not been fully tested empirically. The empirical derivations of hypotheses about the relationships of antecedents, work-family interplay and stress consequences are described in detail in each study.

In *Chapter 3*, Study I "Effort-reward imbalance theory and irritation: The important role of internal and external work-family conflict" is presented. This study aims at answering Research Question 1 "What influences do variables of a classic occupational health theory have in the context of WFC and stress?" In the introduction, the lack and relevance of integrating WFC is described. In the theory section, effort-reward imbalance theory and irritation as a stress indicator are defined and are related to each other. After that, the role of WFC in this framework is clarified. It is hypothesized that effort and overcommitment (OC) are positively related to irritation whereas reward is negatively related to irritation as well as to internal and external WFC. Moreover, it is

assumed that external and internal WFC are positively associated with irritation. Additionally, different ERI-OC-combination types are supposed to relate differently to irritation as well as to internal and external WFC. In the method section, all important information about the study realization and analysis are depicted. After that, results are described and discussed.

In *Chapter 4*, Study II “Personal and organizational resources of family caregivers’ mental health: Confirmation of a comprehensive work-family mediator model” is depicted. This investigation’s goal is to give an answer to Research Question 2 “What are important resources for employed informal family caregivers when confronted with different types of WFC and stress?” In the introduction, the need for more consideration of employees with informal family caregiving responsibilities other than children is highlighted. In the theory part, it is carved out what the differences between the different caregiving responsibilities are and what these mean for caregivers’ WFC and irritation. Moreover, work-family culture as an organizational resource and health-related self-efficacy as a personal resource are introduced. It is hypothesized that these resources are negatively associated with internal and external WFC and irritation. Additionally, based on conservation of resources theory it is assumed that there are reciprocal effects between internal and external WFC and irritation. The implementation and analysis of the conducted employee survey is described in the method section. Then, study results are exemplified and discussed.

In *Chapter 5*, Study III “The relationship between work-family interplay and cortisol as a biomarker of stress” is presented. This study’s objective is to answer Research Question 3 “Do different types of WFC as well as work-family balance have an impact on a biomarker of stress such as cortisol?” Firstly, the research gap of objective indicators in the work-family research domain is introduced. Then, in the theory section, internal and external WFC are defined. Beyond that the overall evaluation of work-family balance is described. Moreover, the relevance of cortisol as a biomarker of stress is highlighted. Additionally, an actually modern resource, namely resilience, is proposed as being important for cortisol reaction as well as work-family interplay. Thus, it is hypothesized that internal and external WFC are positively associated with the stress hormone whereas resilience and work-family balance are negatively related to cortisol. In addition to the standard description of the study design,

the sample, the measures and the analytical strategy, the specifics of cortisol measurement are mentioned in the method section. Finally, the study's results are described as well as discussed.

In *Chapter 6*, the results of all three studies are discussed as follows: Firstly, all findings will be summarized and their theoretical and methodological contributions to existing research will be stated. Then, theoretical and empirical limitations and implications for further research will be discussed in the light of the developed comprehensive model, which was described in Chapter 2. Consequently, practical recommendations for HR experts will be given due to this dissertation's findings. Finally, a conclusion of the dissertation will be drawn.

## **2. Theoretical Background**

The aim of this chapter is to provide an overview of the relevant theoretical background that is necessary for the understanding of the relationship between work-family interplay and stress. Firstly, for a better understanding of the work-family interplay, its relevance regarding life-domain balance is described. As theoretical background, role theory will be explained in order to get an overview about different facets of the work-family interplay and for a deeper knowledge about the different types of work-family conflict, which will be defined thereafter. Secondly, different theoretical approaches regarding stress are summarized shortly and the conservation of resources theory by Hobfoll (1989) as stress theory, which is appropriate for the explanation of the relationship between work-family interplay and stress, is introduced. This relationship is described in more detail in the following section and the dissertation's research model is then generated step by step. Therefore, the following parts should strengthen readers' insight into how the comprehensive research model was developed.

### **2.1 Work-Family Interplay**

Work-family interplay is an important topic for many people, because work and family are crucial domains in their lives (Frone, Russell, & Cooper, 1992). Naturally, people have essential (life) goals they want to reach in these domains and that have impact on their self-concept, life-satisfaction and well-being. Therefore, they invest many resources such as time, energy, engagement and passion in both domains, which both are demanding and sometimes challenging. But the biggest challenge is to successfully combine demands and resources from both domains in a lifelong process with changing circumstances and even changing targets. Thus, the integration of the work and the family domain is a complex enduring interplay between oneself, family and work.

#### **Work-family interplay as a part of life domain balance**

The overall concept of work-family interplay is life domain balance (cf. Ulich & Wiese, 2011), which includes positive and negative experiences in various life domains such as work, home work, relationships with children, partners and parents, hobbies, sports as well as volunteering (cf. Brauchli, Hämmig, Güntert, Bauer, & Wehner, 2012). Everyone has different roles in various life domains which are related to different aims.

According to Hoff et al. (2005), there are three general strategies of arranging these life domain aims. First, *segmentation* means that two domains such as work and family exist in parallel without any intersection. Thus, concerning contents and places, both domains are independent of each other and they are equitable regarding time resources as well as importance. Therefore, the aims of these domains cannot interfere. The second arrangement seems to be the opposite: *blurring of the boundaries* means that the domains are fully interconnected. That can be the case in two forms: either one domain fully absorbs the other, such as it is the case with a woman in a top management position with a lot of work but without a family or a partner, or both domains merge into each other, such as it is the case with a freelancer who works at home. The third and most common strategy is a dynamic balance which is called *integration*. This strategy aims at incorporating work as well as private objectives in everyday life as well as in the planning of one's own biography. Therefore, integration often leads to curtailments in both domains and to interference because people have experienced that they do not meet all requirements. But, on the other hand, people can benefit from participating in different domains. These interferences and benefits by combination of roles are explained by role theories.

### **Role theory as a theoretical background of the work-family interface**

Before the work-family interplay is explained by means of role theory, it is described what is meant by a role and how differently roles can interact with each other in general. Thus, a role is defined as “a pattern of expectations which apply to a particular social position and which normally persist independently of the personalities occupying the position” (Sieber, 1974, p. 569). Therefore, everyone has different roles in various social settings such as work, family, a sports club and many more. These social roles are main characteristics of our self-identities (cf. Frone, 2003). Theories regarding role interplay are grounded on different approaches (Wiese, 2007): (1) stress and resources theoretical approaches, (2) task analysis approaches including time-budget research (cf. Hoff et al., 2005) and activity analysis (cf. Fenzl & Resch, 2005), (3) development- and biography-oriented approaches (cf. Abele, 2005; Hoff et al., 2005).

Because the aim of this dissertation is to explain employees' stress by important antecedents in the light of the work-family interplay, the focus will be on the first

approach. One of the early stress and resources theoretical approaches is the theory of role strain, which is defined as the “difficulty of fulfilling role demands” (Goode, 1960, p. 483). According to Goode (1960), everyone who has more than one social role will per se experience role strain, because some interference is unavoidable and normal. In general, role conflict is defined as “the simultaneous occurrence of two or more role expectations such that compliance with one would make compliance with the other more difficult” (Katz & Kahn, 1978, p. 204). According to role-theory (cf. Cooper, Dewe, & O'Driscoll, 2001; Goode, 1960; Greenhaus & Beutell, 1985; Johns & Saks, 2008; Katz & Kahn, 1978; Sieber, 1974), four different types of role conflicts are distinguished: (1) intra-sender role conflict, (2) inter-sender role conflict, (3) inter-role conflict and (4) person-role conflict. *Intra-sender role conflict* is characterized by a single role sender who communicates different role-related expectations to one role-receiver, which can lead to role ambiguity. *Inter-sender role conflict* means that different role-senders send dissimilar prospects to one focal person. *Inter-role conflict* is defined by various demands of several roles of the role-receiver which are mutually incompatible. At last, *person-role conflict* arises not if the different roles are incompatible but if the personality of the role occupant is not suitable for the role demands.

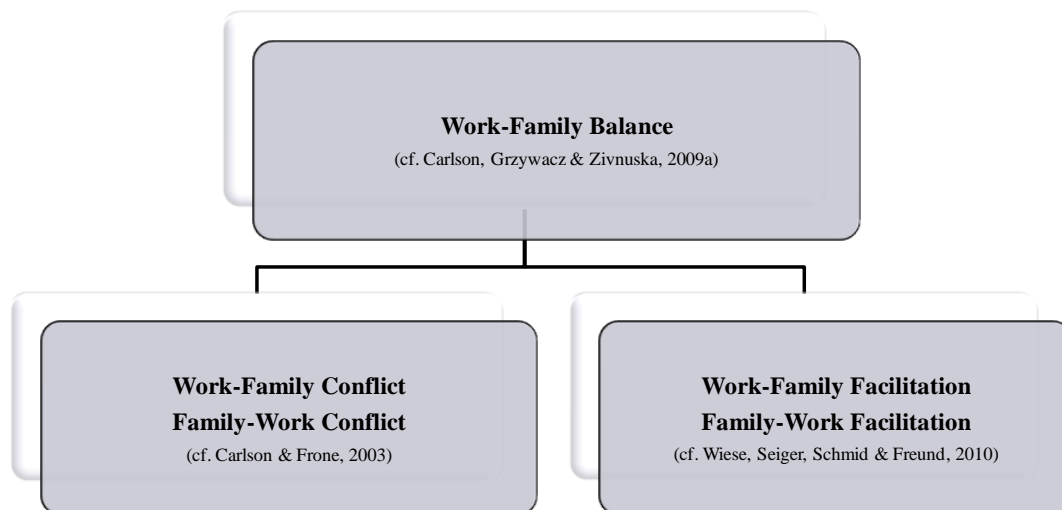
Moreover, Sieber (1974) emphasized in his theory of role accumulation that having multiple roles can also have beneficial effects such as “(1) role privileges, (2) overall status security, (3) resources for status enhancement and role performance, and (4) enrichment of the personality and ego gratification” (p. 569). Similarly, Marks (1977) noted that different scarcity approaches about limited resources that people have for the fulfillment of different roles do not fully explain people’s social lives. Otherwise it would mainly be characterized by economic considerations about investments in the fulfillment of expectations of role-related partners, because according to them, all social activities cost resources. Marks (1977) argued that this is not true, because people who participate in role-related activities also experience that they gain new resources by participation. According to this point of view, people should not only develop strategies for reducing role strain but also for enhancing the beneficial effects of role interplay.

After the description of interacting roles in general, the interplay of work and family roles will now be considered as follows: Many work-family researchers from

different occupations such as psychology, sociology, economics or medicine etc. investigate this role interface of work and family domains. Despite different definitions experts agree that there is a higher-level individually evaluation of the successful interplay (work-family balance, WFB) and there are also, at a lower level, negative experiences of conflicts between both domains as well as positive experiences between both domains such as facilitation. Here, WFB is defined as the “accomplishment of role-related expectations that are negotiated and shared between an individual and his or her role-related partners in the work and family domains“ (Grzywacz & Carlson, 2007, p. 458). This definition differs from others in that it considers WFB a psychological experience which includes the social context. Therefore, it is still in the eye of the beholder. However, for the individuals’ evaluation of this interface even the expectations of relevant others of both domains are important. This definition is free of requirements for the development of balance, such as that balance is reached only if there are no conflicts between both domains or if there are no conflicts but a maximum of facilitation between both domains (cf. Frone, 2003; Greenhaus & Beutell, 1985). Rather, balance can also be experienced although conflicts occur sometimes. This definition is nearer to experiences of employees because there always will be some interference but they can also have the feeling that, in general, all basic expectations are met in work as well as family domains. WFB is distinct from WFC and facilitation in the way that it is the global concept which is independent of the amount of how strongly work has positive or negative impact on family and vice versa. Therefore, WFC and facilitation determine some portion of WFB but there are also other influencing aspects such as the skillfulness to clarify realistic expectations with crucial role-related partners (Carlson, Grzywacz, & Zivnuska, 2009a). As a last point, the term balance has often been criticized (cf. Halpern & Murphy, 2005; Hoff et al., 2005; Resch & Bamberg, 2005), because balance indicates that there is some equilibrium between work and life domains such as an equal distribution of resources such as time, energy or engagement and maybe even equal distribution of demands. But it is important to understand balance in the framework of role balance theory, which “suggests that people seek full and meaningful experiences in their work and family lives” (Grzywacz & Carlson, 2007, p. 457) independently of an exact distribution. Therefore, the correct term for the work-family interplay should be work-family interaction. But this dissertation investigates the construct which was originally named WFB. Therefore, this term will



be used in the following. To sum up the definition of WFB, it can be concluded that it includes at least two components: conflict and facilitation (Frone, 2003). The complete concept of WFB is depicted in Figure 1. Here, WFB is not the result of low conflict and high facilitation as proposed by Frone (2003). Rather, WFB is the general concept which goes beyond that (Carlson et al., 2009a).



*Figure 1.* Different facets of the work-family interplay.

At the lower level of evaluation, work and family domains can have positive as well as negative impact on each other. Thus, work can have influence on family (WF) or family can have influence on work (FW). This differentiation is important, because sources of conflicts or facilitation of the WF direction have mostly been found in aspects of the work domain while causes for experiences of the FW direction have often been found in the family domain (Frone, 2003). Work-family facilitation is “the extent to which participation at work (or home) is made easier by virtue of the experiences, skills, and opportunities gained or developed at work (or home)” (Frone, 2003, p. 145). In the last years the research about positive effects of the work-family interplay has begun to grow and there are a lot of somewhat different conceptualizations, such as positive spillover, enhancement, facilitation and enrichment (cf. Poelmans, Stepanova, & Masuda, 2008). Research has shown that for the prediction of employees’ stress often the conflicts of work and family domains are more important than facilitation (cf. Innstrand, Langballe, Espnes, Falkum, & Aasland, 2008; Kinnunen, Feldt, Geurts, &

Pulkkinen, 2006; Montgomery, Peeters, Schaufeli, & den Ouden, 2003). This can be explained by a generalization of the match principle described by de Jonge and Dormann (2006) as well as the dual process of the job demands-resources model (cf. Hakanen & Roodt, 2010). According to these principles, stressors such as conflicts better predict strains, whereas resources such as facilitation better explain positive health outcomes. In order to reach the first overall aim of this dissertation, which is the identification of personal and organizational antecedents that are important predictors regarding stress outcomes, the focus will be on work-family conflict rather than on facilitation. Moreover, work-family conflict has stronger negative impact on the employees' stress level than family-work conflict (Amstad et al., 2011; Innstrand et al., 2008). Therefore, the dissertation focuses on WFC in the following. To enlarge existing research, WFB as the complete evaluation of the work-family interplay, which is a higher-level variable in contrast to facilitation, will be considered in order to find out what influence this overall work-family variable has on stress.

### **Focusing on work-family conflict**

In terms of role theory, conflicts between work and family are inter-role conflicts (cf. Greenhaus & Beutell, 1985). Greenhaus and Beutell (1985) differentiated between three different main types of interferences: First, *time-based conflict* is similar to role overload, thus it occurs when people do not have enough time to fulfill expectations of work and family domains. Work-related antecedents of this conflict are time demands such as working hours, working overtime, inflexible work schedule and shift work. Family-related antecedents of time-based conflict are related to the intensity of needed care for family demands such as young children, spouse employment or large families. Second, *strain-based conflict* exists when people experience strain from one role domain which interferes the fulfillment of another role demand. Sources which are work-related seem to be role ambiguity or boundary-spanning activities whereas sources which are family-related are for example low spouse support. Third, *behavior-based conflict* arises when different roles require different and contradictory behavioral patterns. Work roles, for instance, are related to behavior that is performance-oriented and professional while the behavior expected by the family may be sensitive and spontaneous (cf. Greenhaus & Beutell, 1985). Behavioral-based conflict has often been neglected in previous research (cf. Dierdorff & Ellington, 2008; Wiese, 2007).

Another conceptualization of a conflict typology was developed by Carlson and Frone (2003), who considered behavioral and psychological role involvement in the work and family domains. According to them, “behavioral involvement refers to the investment of time and physical resources, whereas psychological involvement refers to the investment of cognitive and emotional resources” (Carlson & Frone, 2003, p. 516). Thus, they distinguished whether interference between work and family domains is generated behaviorally and therefore externally or psychologically and therefore internally. Further, in accordance with previous literature, they included both directions from work to family and vice versa in their concept. Thus, this four-factor conceptualization includes four conflict types: external WFC, internal WFC, external family-work conflict (FWC) and internal FWC. An example of external WFC is when someone has to work overtime and is therefore not able to put his/her child at home to bed. Internal WFC occurs, for example, when someone is intellectually busy with a work problem while he is at home and is thus less engaged in his/her family role. External FWC happens if someone has to wait for the professional elder care service and therefore is coming too late to work. And as a last example, internal FWC refers to situations in which, for example, someone is sitting in his bureau and has to think permanently about his sick parent at home and is thus not able to concentrate on his work tasks. To date, this conceptualization has not reached much research attention (Haggag, Geser, Ostermann, & Schusterschitz, 2012), but the different causes of role involvement for the explanation of WFC are promising regarding stress and intervention activities. Moreover, this definition includes behavioral sources of WFC, and, as mentioned above, this facet of the previously described definition has often been neglected (cf. Dierdorff & Ellington, 2008; Wiese, 2007). Moreover, I argue that this conceptualization fits best to the overall concept of WFB, because the extent to which someone is involved in his/her role makes it more or less worse if he/she experiences that certain role-related expectations will not be fulfilled.

In general, previous research has shown that people experience more WFC than FWC (Carlson & Frone, 2003; Frone, 2003; Haggag et al., 2012). Additionally, WFC has stronger negative impact on WFB (Carlson et al., 2009a) and health-related outcomes (Amstad et al., 2011; Innstrand et al., 2008; Montgomery et al., 2003) than FWC. This is also true with regard to other work-related outcomes such as job

satisfaction, organizational commitment and turnover intention (Carlson et al., 2009a). Additionally, according to Judge and Colquitt (2004), “work-family conflict represents one specific form of role conflict that appears in virtually every listing of the key stressors in reviews of the literature” (p. 397). Therefore, this dissertation focuses on WFC but with a more differentiated look on internal and external WFC, which has often been neglected in previous research.

In their agenda for future research, Carlson and Frone (2003) called for more accurate research regarding health outcomes, suspecting that “internal interference may have a stronger deleterious effect on health than external interference” (Carlson & Frone, 2003, p. 532). This assumption will be investigated in this dissertation under consideration of important antecedents.

## **2.2 Stress**

The engagement in stress research mostly implies the question of how to stay healthy. As for mental health, one challenge is that it is defined by a comprehensive and all-embracing health definition by the WHO (1986), which is that “health is a state of complete physical, mental and social well-being” (p. 5). Furthermore, psychological health is a state or process with multiple causes (Ulich & Wülser, 2008). While in one short moment mental health is a state (Faltermajer, 2009), in a longer time-interval health is viewed as a process which varies over time (Faltermajer, 2009). Antonovsky (1979; 1987) thought of a continuum with health on the one side and disease on the other side. On his “Health-Disease”-Continuum a person is more or less healthy or ill. Thus, in contrast to the WHO-definition of health, it is assumed that it is almost unrealistic that someone is completely healthy or ill in his or her physical, mental and social well-being. This is similar with regard to stress, because it is not the aim to live without any stress but rather to be able to handle stressors in a way that is appropriate to one’s own coping resources. This will be described in detail with regard to the stress-strain differentiation later.

Stress in the workplace is especially important for a psychological disorder if (1) the stressful situation is chronic, (2) adaption is difficult due to constant need of attention and efforts, (3) failing has crucial negative consequences and (4) problems spill over to other domains (cf. Kasl, 1992; Semmer & Mohr, 2001). This statement

highlights the importance of stress for mental health but with regard to the work-family domain, because (1) work-family interplay is an enduring process which is never finally finished as one is active in both domains, (2) at the same time both domains have high expectations and requirements on the individual for being successful in both domains, (3) both are crucial life domains in which failing can have fatal consequences and (4) negative experiences spill over from one domain to the other. Therefore, in the following the stress concept will be described in more detail.

There are some different approaches to defining what is understood by the term stress (cf. Cooper et al., 2001). The *response-based definition* of stress assumes that stress is a dependent variable. This view developed from a physiological understanding of the general adaptation syndrome conducted by Selye (1956; 1983), who thought that stress is an unspecific reaction of the body to various demands. This reaction includes three steps: (1) the direct reaction of the psychophysiology (alarm reaction), which activates the defense, fight or flight reaction (cf. Cannon, 1935) with increased sympathetic activation; it is followed by (2) a resistance reaction to a continual stressor normally resulting in a recovered equilibrium but under conditions of intense and long-lasting occurrence the adaption process fails and the collapse stage (3) is reached. In contrast to this early definition, research about this theory found that there are different patterns of stress reactions which are specific to the stressor and associated with different hormonal reactions (Cooper et al., 2001). However, one important idea was that, in the sense of Selye (1956; 1983), stress is not exclusively bad but that certain levels of stress are beneficial for motivational processes (Cooper et al., 2001). Important is that this is in form of a short-term experience which alternates with phases of relaxation (Kaluza, 2011). This is similar to the experience of WFC in the sense that some WFC is not per se deleterious. With some WFC, it can rather be seen as a hint to rethink the actual organization and expectations of the work and family domain. Still, if WFC is too high, it is a serious stressor. Therefore, stress was seen as normal and unavoidable in an individual's life. In contrast, distress occurs when the stress levels are too high.

Nevertheless, what has mostly been criticized was that such response-based approaches neglected environmental stimuli (Cooper et al., 2001). Therefore, another important approach is the *stimulus-based definition* of stress. In contrast to the approach

described before, this one focuses on the possible sources of stress, thus on stressors which have negative impact on the well-being of the individual. Thus, stress is an independent variable here. Elliot and Eisdorfer (1982) differentiated between four types of stressors: (1) acute, time-limited stressors, (2) stressor sequences, (3) intermittent stressors as well as (4) chronic stressors. If incidents of these categories are normally experienced as stressful, they are defined as a stressor (Hobfoll, 1989). Today, according to the stress-strain differentiation, psychological stress means the integrity of all external influences such as work task, work equipment, physical and social work environment that have psychological impact on people (Bamberg, Busch, & Ducki, 2003; Demerouti et al., 2012), whereas psychological strain is the direct individual consequence of stress which depends on the people's state and requirements (Bamberg et al., 2003; Demerouti et al., 2012). Consequences of strain are activation or warming up effects as benefitting consequences or fatigue, monotony, reduced vigilance or psychic saturation as impairing consequences. In the past, the stimulus-based approach resulted in extensive investigations on objective stressors of the work environment such as task arrangement and climate aspects of bureaus. But according to Lazarus (1966), these objective stressors themselves do not allow to predict individuals' strain. Rather, this depends on the perception of the stressor and the perception of resources the individual has. Nevertheless, according to Cooper et al. (2001), "although the stimulus model has limitations, it is useful in identifying common stressor themes or patterns that might affect the majority of the workforce" (p. 8). Overall, response as well as stimulus approaches fail to consider individual as well as cognitive aspects of psychological functioning. More precisely, to sum up the criticism of these approaches, stimulus- and response-oriented theories focus on just one aspect of a whole stress process, whereas characteristics of the stressor as well as the response were neglected, too. Therefore, response-oriented approaches did not differentiate between different patterns of specific potential responses. Despite that, it is important to examine whether the relationship of two constructs is different due to the different operationalization of variables. Thus for example, which is the dependent variable that indicates stress and are there different patterns of dependencies due to this specific indicator? Therefore, the answer to a research question could be different regarding different stress indicators such as well-being, burnout, irritation or physiological stress indicators. As mentioned above, stress

is more multicausal and personality characteristics are important as direct predictors as well as moderating variables.

Moreover, Spielberger (1966; 1972) presented the *event-related approach*, which has been used to explain stress in the context of important incidents and the individual's perception of them. Additionally, there are *interactional approaches* to stress, which investigate statistical interaction of the combination of two variables in explaining stress. This procedure of the analysis of potential moderators is important but limited in explaining the causal relationships. Therefore, Cooper et al. (2001) concluded that beyond the analysis of moderators it is more important now to investigate comprehensive theories and models which are able to explain the relationships of all relevant variables. According to him, this is the case with *transactional models* of stress, which "endeavor to explore the essential nature of the stressor-response-outcome relationships and to encapsulate an understanding of the dynamic stress process itself, not merely the statistical relationships between variables" (Cooper et al., 2001, p. 11). The most influential and prominent transactional stress theory was developed by Lazarus. According to Lazarus (1966; 1991), individuals evaluate whether upcoming situations are threats, losses or challenges (*primary appraisal*). Thereafter, individuals assess whether they have appropriate resources to cope with this situation (*secondary appraisal*). In reality, these two evaluation steps generally occur immediately. Over time people learn to cope with or habituate to certain situations, which are therefore re-evaluated (*reappraisal*). Whether situations are stressful depends therefore on the specific situation, the evaluation of the individual and his/her characteristics. In contrast to the stress-strain model, even endogenous personal stressors and resources are considered. Moreover, this model includes stressors and resources in relation with stress but also the interlinking mechanism. Therefore, according to this theory, stress is a dynamic process of the individual and his environment with the aim to maintain or re-establish homeostasis or balance (Cooper et al., 2001). To sum up, stress occurs if the individual experiences that demands outweigh the individual's resources (Cooper et al., 2001; Lazarus, 1991). Although this model is very prominent, some criticism has been expressed, for example by Hobfoll (1989), who stated that demands and coping capacity were not distinctly defined, rather it is a circular definition. Further, demands and resources can only be defined post hoc, when they already have influenced individuals'

perception and therefore individuals' stress level. According to Hobfoll (1989), it is furthermore important to have some environmental anchor points of stressors. Thereby, it can be determined if incidents are stressful or not by comparing the reactions of people who differ in their overall resources such as hardiness or resilience. As a last point, the same criticism as with work-life balance arose: the concept and term balance respectively implies that two entities are comparable and units of these entities are definable. As for balancing work and life domains, this is difficult even for demands and resources.

The aim of this dissertation is to validate and further develop a comprehensive model of employees' stress including personal and organizational antecedents. Therefore, as an overlapping stress theory, the conservation of resources (COR) model will be used. According to Westman et al. (2005), "to date, individual studies and meta-analyses have found COR theory to be a major explanatory model for understanding the stress process at work" (p. 167). Because the focus of this dissertation is on the role of the interplay of the work and family domain in this relationship, an exclusively work- or family-domain specific stress theory does not seem to be the best choice (cf. stress-strain concept of DIN EN ISO 10075-1 till -3, Demerouti et al., 2012; Grandey & Cropanzano, 1999). In contrast, the COR theory is domain unspecific, includes secondary resources such as work, family and time (Westman et al., 2005) and is therefore most suitable for this dissertation.

### **Conservation of resources theory**

COR theory is a "resource-oriented model [which] is based on the supposition that people strive to retain, protect, and build resources and that what is threatening to them is the potential or actual loss of these valued resources" (Hobfoll, 1989, p. 513). Therefore, stress is experienced if individuals, in interaction with their environment, anticipate or actually experience the loss of important resources or if the gain of resources fails after resource investment. Thus, in contrast to other theoretical approaches, this model includes environmental as well as internal stress processes (Hobfoll, 2001). The basis of this theory is the idea that people naturally engage in behavior that is associated with positive feelings, the environment and the reinforcement of the self. Therefore, they (further) develop their personal characteristics as well as social circumstances. These should help them to prevent resource loss and



increase resource gain. Therefore, “resources are defined as those objects, personal characteristics, conditions, or energies that are valued by the individual or that serve as a means for attainment of these objects, personal characteristics, conditions or energies” (Hobfoll, 1989, p. 516). Thus, resources are instrumentally important for individuals to reach their goals as well as symbolically to shape individuals’ self-concepts. *Objects* such as a home are one kind of resources which are important in the stress process due to their relationship with socioeconomic status. *Conditions* such as a satisfying marriage or seniority in an organization can increase an individual’s stress resistance. *Personal characteristics* can color people’s perceptions of the world and therefore, overall personal characteristics such as general resistance resources, sense of coherence (Antonovsky, 1979), resilience as well as positive affectivity have important impact on stress levels. Furthermore, *energies* are resources such as time, competences, or money that are not so much intrinsically relevant but rather in their functioning of sourcing other resources. Moreover, Hobfoll (1989) stated about social relations which do not fit in these four categories that they can offer or enable maintenance of important resources but that they can also withdraw individuals’ resources, which is a crucial statement regarding the work-family interplay and an early but indirect notion of the positive as well as negative consequences of this interplay. As stated by Hobfoll (2001), resources are not only individually defined but also determined by culture.

*Loss* is central to COR theory. Past research has shown that the most stressful experience for people is to lose something really important to them, such as a spouse, child, or their job. These are critical incidents which involve crucial changes in individuals’ lives and are also a threat for existing self-concepts. Beyond that, there are rather minor life events which can have impact on the stress level, such as the illness of a family member or organizational readjustment. These events have in common that they are often undesirable and that they limit alternatives, leaving the individual without a chance of having any control over this change. Moreover, according to the COR theory, there are also events that are positive, such as a marriage, and therefore reduce stress. But according to the first principle of the COR theory (cf. Hobfoll, 2011), resource loss has an exceedingly negative impact on individuals in relation to resource gain. After a loss, people naturally strive to *replace* the lost one by new resources, such as a remarriage after a divorce. If a replacement is not realizable, it is also possible to

*substitute* the lost resource with a similar one from another domain (Hobfoll, 2001). But resources are limited and facing big amounts of loss can lead to experiences of *loss spirals*. These occur if a person already has a lack of resource and he/she needs to replace these resources with others, but is therefore more prone to lose even more resources. The perception of resources in the sense of Lazarus is important in the COR theory. However, Hobfoll (1989) noted that perception is not exclusively shaped by the individual but that it is influenced by culture and the environment as well. Moreover, individuals are able to *reinterpret* stressors, such as a threat can be interpreted as a challenge. This is most probable if stressors and their consequences are not distinctly positive or negative. But this is not the case for all stressors, as really serious, negative stressors will not likely be interpreted positively. Similar to Lazarus, Hobfoll (1989) assumed that resources can be *reevaluated*, such as work stress due to a low performance can be lowered by valuing career options lower. This strategy, however, is limited if work performance is an important value of the culture or society someone lives in and is therefore important for the individuals' self-concept. The most important strategy against resource loss is *resource investment*. This is especially relevant because individuals who have more resources available are less prone to resource loss, have better abilities to recover faster from resource loss and even gain more new resources than those with lesser resources (Hobfoll, 2001).

According to a commendation by Hobfoll (2011), “work and family domains are both jealous demanders of individuals' resources, and to the extent that resources are built in one domain that facilitates the other domain, this ‘battle for resources’ can become a common agenda” (p. 118). Therefore, the next section describes the relationship between work-family interplay and stress from the viewpoint of COR theory.

## **2.3 Relationship of Work-Family Interplay and Stress: Development of the Research Model**

### **COR theory and the work-family interplay**

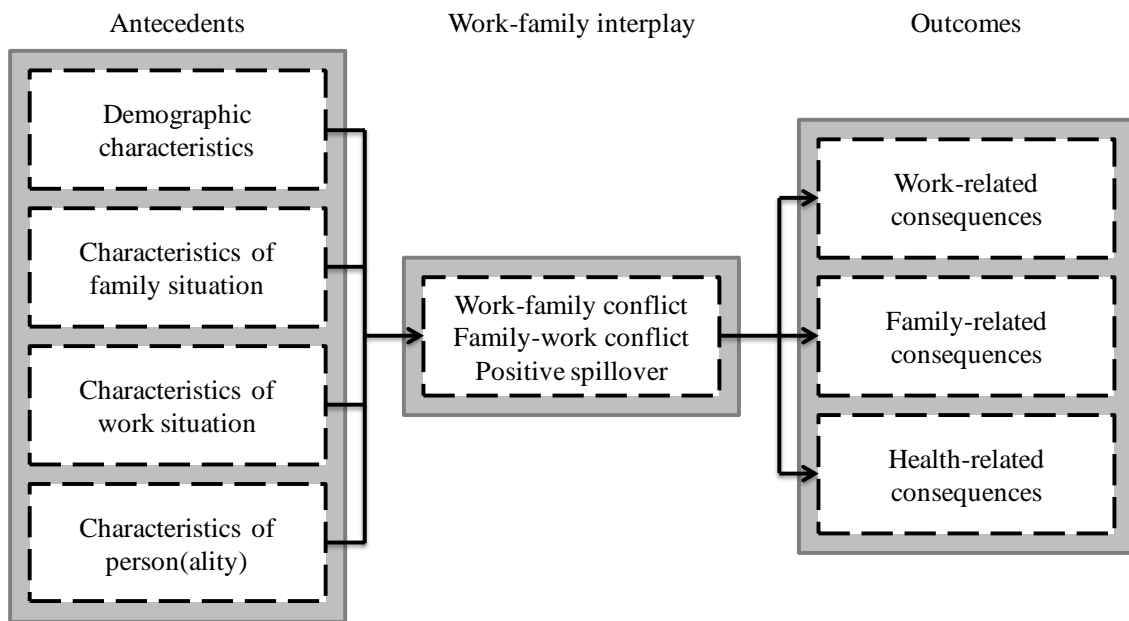
For the first time, Grandey and Cropanzano (1999) applied the COR model to the relationship of WFC and strain and investigated their assumptions with a sample of university professors. According to these authors, “the COR model proposes that

interrole conflict leads to stress because resources are lost in the process of juggling both work and family roles” (Grandey & Cropanzano, 1999, p. 352). This assumption is theoretically justified because, on the one hand, both roles need resource investment, for example of energies such as time, while, on the other hand, the integration of work and family responsibilities themselves is energy consuming. For practical implications it is therefore important to identify, which aspects have great potential to be a resource consumer, but also which aspects are appropriate for a minimization of potential or actual resource losses. According to Grandey and Cropanzano (1999), individual differences of resources are very important in a comprehensive COR model.

### **Development of the dissertation’s research model**

There are various studies in different research areas such as psychology, economics, demographics, and many more, that investigate the relationship of work-family interplay and stress. Despite that, only a few of them considered the variables that are investigated in this dissertation in a comprehensive, theory-based model. Therefore, before answering the research questions mentioned above, the COR-related theoretical framework for all three studies will be described. The aim was to develop a theory-based model with most practical relevance.

In the extant literature, work-family interface plays different roles in the stressor-strain relationship, such as being a stressor, a mediator or a stress-response (Demerouti, Bakker, & Bulters, 2004). For theoretical reasons, which are explained below (point 6), this dissertation focuses on the mediator functioning of the work-family interplay. In extant literature, there are several different mediator models (cf. Hämmig & Bauer, 2010; Janssen, Peeters, de Jonge, Houkes, & Tummers, 2004; Kinnunen, Mauno, Geurts, & Dikkers, 2005; Mauno, Kinnunen, & Pyykkö, 2005; Peeters, Watez, Demerouti, & de Regt, 2009; Wiese, 2004). Under the title *work-life-balance as a theme of workplace health promotion*, Hämmig and Bauer (2010) presented the cause-and-effect model depicted in Figure 2.



*Figure 2.* Model of cause-and-effect relationships with regard to the role of work-family interplay. Adapted from “Work-Life Balance - ein Thema der Betrieblichen Gesundheitsförderung” by O. Hämmig and G. F. Bauer, In: G. Faller (ed.), *Betriebliche Gesundheitsförderung*, 2010, p. 233, Copyright 2010 by Verlag Hans Huber.

This is the most recent mediator model that comprises the majority of antecedents and outcomes and will therefore be the comparison-model for the model development in this dissertation. This comparison-model has not been fully tested empirically yet. In contrast to the original comparison-model, this one also includes FWC for the sake of completeness. The aim of this dissertation is to investigate a comprehensive model which is really useful for practical workplace health promotion. Therefore, the following seven points, which will be described in detail, are important for the development of an enhanced comprehensive model and thus crucial for this dissertation and the contribution to extant literature:

- (1) Categories of antecedents,
- (2) Focus on WFC and WFB,
- (3) Differentiation between internal and external WFC,
- (4) Health-related consequence: Irritation,

(5) Biomarker of stress: Cortisol,

(6) Direct and indirect effects of the antecedents on stress and

(7) Reciprocal relations between internal and external WFC and irritation.

**(1) Categories of antecedents.** Previous research has shown that the four *categories of antecedents* - demographic characteristics, characteristics of the family and the work situation as well as characteristics of the person(ality) - seem to be important predictors of the work-family interplay. For workplace health promotion activities, it seems to be unrealistic to try to change anything about demographic characteristics as well as about the family situation. Unless it is unchangeable for the organization, the knowledge about specific subpopulations and their needs is important for HR experts and their activities' effectiveness. An issue of raising importance is when employees who have to informally care for their dependent relatives have to receive other organizational support than employees with childcare responsibilities. To investigate whether the general associations between WFC and stress are the same with regard to informal care responsibilities, Study II will focus on such sample. Especially characteristics of the workplace are important for engagement in situational prevention. Classically, personality traits are assumed to be stable over time and situations. The experiences of different facets of the work-family interplay are influenced by personality traits. With regard to workplace health promotion, it is not realistic to change someone's personality, but it should be possible to some degree to have influence on perception patterns due to certain personal characteristics. Therefore, this is an anchor point for behavioral prevention. To sum this point up, because this dissertation is specified on occupational health psychology, it focuses on antecedents which belong to the both most important key-actors: work characteristics and individuals' characteristics.

Regarding *characteristics of the work situation*, Frone et al. (1992) showed that general job stressors are positively related to WFC. More precisely, the meta-analytic review conducted by Byron (2005) found that job involvement, hours spent at work and job stress were positively associated with WFC, whereas work support and schedule flexibility were negatively related to WFC. In the model of this dissertation effort, reward and work-family culture are considered. *Effort* and *reward* are two main aspects

of one of the most prominent and influential occupational health theories - effort-reward imbalance (ERI) theory. Therefore, such aspects should be considered in a comprehensive model to investigate, which effect this demand and this resource have with regard to WFC and stress when investigated in one model. Due to this approach, HR experts of workplace health promotion have a basis for a decision on where to start with mental health promotion - focusing on classic models, on WFC or the interdependences. *Work-family culture* is a work-family specific variable which is associated with well-being and job satisfaction (Wiese, 2004) should be further analyzed regarding its impact on internal and external WFC as well as stress. Therefore, HR experts can conclude whether such activities are beneficial for work-life-balance as well as health promotion of an organization. This should give a hint at whether it is necessary for HR experts of the work-life-balance field as well as HR experts of the mental health field to work together more closely and integrate their know how to comprehensive activities.

According to COR theory, efforts are resources consuming because, from a certain threshold of demands, individuals experience work role stress, which needs much energy. As this leaves fewer resources for the family domain, the individual's WFC as well as stress level should be increased. In contrast, rewards are seen as resources because, according to COR theory, people strive for such positive experiences. This is the same for work-family culture, which is a resource on the interpersonal-level regarding family-friendly management but also on the energy-level with work-family arrangements which are beneficial for individuals' resource levels, for example because of appropriate time demands at work.

*Characteristics of the person* in this comprehensive model are overcommitment, health-related self-efficacy and resilience. *Overcommitment* is very interesting in such a model because, on the one hand, organizations strive for strongly attached employees but, on the other hand, overly work-committed people are vulnerable to experience role conflicts with other than work roles and suffer impaired health according to ERI theory. As mentioned above, one important antecedent of WFC is the importance that an individual attributes to work and family domains. Therefore, different studies have shown that job involvement is a predictor of WFC (Adams, King, & King, 1996; Byron, 2005; Carlson & Frone, 2003; Frone et al., 1992; Greenhaus & Beutell, 1985), which is

a similar construct to OC. *Health-related self-efficacy* has not been investigated yet with regard to work-family interplay but seems to be very important for workplace health promotion, because knowledge about the impact of this specific concept of self-efficacy should give hints for health-related HR development programs. *Resilience*, which is the psychological resistance that enables people to develop even under bad circumstances, is a modern topic and also a crucial variable for mental health and maybe even for work-family interplay. This will be tested through the model of this dissertation.

As mentioned above, according to COR theory personal characteristics that have minimizing influence on resource loss are very important. Both health-related self-efficacy as well as resilience are very suitable for resource protection, because both include an overall assumption that one's own health and other challenges, respectively, are manageable. After a failure, resilient individuals are even stronger than before, because they have learned from that new experience. This is in accordance with the principle 2 of the COR model, which states that those with greater resources are better able to cope with resource loss and also develop better additional resources. Hobfoll (2001) explicitly mentioned self-efficacy as one potential resource that is beneficial due to its direct impact as well as indirect positive impact regarding the proliferation of other resources. Therefore, the author stated with the term *resource caravans* that there are some overall resources which are not only relevant in a short time period but also over life-spans. On the contrary, there are also individual difference variables that tend to be resource consuming, such as negative affectivity. In the work-family interplay, OC seems to be very important because the strong attachment at work is extensively time and energy consuming and if people also have family responsibilities, resource loss is very likely. Additionally, the focus on employees with informal family care responsibilities is also in accordance with COR theory, because critical events and losses such as the loss or impairment of a loved one are some of the most resource consuming experiences in an individual's life.

As a last important argument for this model's antecedents choice is that the simultaneous consideration of demands and resources is important regarding stress, because, according to COR theory, "the fit of personal, social, economic, and environmental resources with external demands determines the direction of stress responding and resultant outcomes" (Hobfoll, 2001, p. 339).

**(2) Focusing on WFC and WFB.** Strictly speaking, FWC as well as facilitation would belong to a complete model of the work-family interplay and stress. This interplay direction will be neglected for two reasons: First, existing literature mostly found that work stressors predicted WFC best and family stressors predicted FWC best (Frone et al., 1992). This assumption is in accordance with COR theory, which also predicts that family role stressors are mainly responsible for FWC (cf. Grandey & Cropanzano, 1999). Some exceptions of that pattern (cf. Byron, 2005) could be the result of an individual's overall personality traits, which have impact on every perception of the individual. As mentioned above, workplace health promotion has, at the utmost, little influence on family stressors. Second, WFC is often stronger pronounced in most individuals than FWC (Carlson & Frone, 2003; Frone, 2003; Haggag et al., 2012) and has an even worse impact on health as well (Amstad et al., 2011; Innstrand et al., 2008). To add a positive aspect of the work-family interplay, Study III will include the overall concept of *work-family balance*. This is in agreement with COR theory - in contrast to role theory - because due to the definition of resources, such as a marriage, the interplay of both roles can also result in a beneficial evaluation such as WFB. Furthermore, as mentioned above, according to the COR theory experiences of losses can be decreased using the strategy of resource substitution. This compensatory cognitions or behavior beyond domains is also included in the overall concept of WFB.

**(3) Differentiation between internal and external WFC.** Most studies did not *differentiate between internal and external WFC*. As mentioned above, for workplace health promotion this division is promising (cf. Carlson & Frone, 2003). Theoretically, it is also important to further investigate whether internal and external WFC have distinct antecedents and which are the best predictors. For example, Carlson and Frone (2003) showed that behavioral work involvement is positively related with external WFC but unpredictably also to a lesser extent with internal WFC. Further, as predicted, psychological work involvement was positively associated with internal WFC exclusively. Thus, it can be concluded that, in general, internal and external WFC have different antecedents with regard to the specific role involvement but that some behaviorally generated antecedents can also have impact - but to a lesser extent - on internal WFC. That was discussed by Carlson and Frone (2003) as an effect in situations



in which, for example, time demands become too high so that the individual cannot psychologically disengage from work. Moreover, it is also possible that internal and external WFC have other health-related consequences.

With regard to COR theory, in the case of both internal as well as external WFC individuals experience that they do not have enough resources to fulfill all role-related expectations. In terms of COR, internal WFC is characterized by consuming cognitive resources for the work-domain while being in the family domain. Therefore, the person might experience resource loss in the family domain. External WFC in terms of COR is characterized by consuming energy resources, such as time, at work while these resources are actually needed for family domain, which is also a confrontation with lost resources.

**(4) Health-related consequence: Irritation.** As a *health-related consequence*, *irritation* will be included in the dissertation model and therefore investigated in Study I and Study II. Irritation is an indicator for work-related strain, which is mainly caused by perceived goal-discrepancy that leads to ruminations (cognitive irritation) and irritability (emotional irritation) (Mohr, Müller, Rigotti, Aycan, & Tschan, 2006). This strain concept seems to be very important in relation to work-family interplay, because these multiple demands raise the likelihood of competing demands and therefore goal-discrepancy in either one or both domains. Moreover, irritation is defined as a psychological state between acute and chronic stress, which is a good screening indicator regarding the point interventions could start in an organization. Often, prevention in organizations does not begin until there are strong enough indicators such as high absence or fluctuation rates. Thus, in the organizational practice, there must be a significant need for action. But regarding individuals' health it is also important not to start with prevention engagement too late when the individual for example is already burned out (cf. Maslach, 1982). According to Hobfoll (2001), "burnout is thought to follow from the third stress condition of the COR theory, such that there is a lack of resource gain [...] following significant resource investment of time, energy, lost opportunities, and borrowing from family time and intimacy to support work" (p. 347). This statement about burnout as an example of progressed impaired health highlights two important aspects: First, if too many resources are already lost, mechanisms of loss spirals begin and a new resource gain becomes extremely difficult. Therefore, the

development of resources in an early stage of the stress process, before it is chronic or even results in burnout, depressions or other mental disorders, is crucial. And second, this quotation also mentions the relevance of the family context, which is neglected when individuals experience WFC and should therefore have strong impact on irritation.

**(5) Biomarker of stress: Cortisol.** To further validate the results on the relationship of internal and external WFC and stress, a *biomarker of stress*, namely cortisol, will be investigated in Study III. According to COR theory, stressors are not only in the eye of the beholder but there are also objective stressors that have impact on many people. If, according to this theory, stressors are objectively ascertainable, then objective stress consequences should also be included in this model. This approach integrates a physiological perspective of stress as well. One of the most prominent biomarkers of stress is cortisol. To date, this indicator has rarely been studied with regard to the work-family interplay. For practical reasons, findings regarding this indicator would further highlight the importance of interventions regarding work-family interplay and stress, because it is associated with severe illnesses and it would be objective evidence that employees de facto experience stress.

**(6) Direct and indirect effects of the antecedents on stress.** Additionally to the model depicted in Figure 1, also *direct and indirect effects of the antecedents on stress* will be investigated. This is important for a better understanding whether certain antecedents have influence on both work-family interplay and stress or whether mediating effects matter. In the existing literature variables of the work-family interplay have been conceptualized in the stressor-strain relationship either as a stressor or as a mediator or as a stress-reaction (Demerouti et al., 2004). In terms of COR theory, in this dissertation work-family interplay is defined as a mediator, because demands or resources lead to the extent of work-family experiences, which in turn are experiences of resource loss or gains and further need resources, which in turn has impact on stress consequences. The additional consideration of the direct effects of the antecedents on the stress consequences is necessary to estimate how much impact of the antecedents is mediated by other variables than work-family interplay on stress. Furthermore, according to the principle in stress research described by de Jonge and Dormann (2006), it is assumed that antecedents that are conceptualized closer to certain outcomes than to

others show greater dependencies to these variables. Thus, work-family antecedents such as work-family culture should show a greater association with WFC than health-specific antecedents such as health-related self-efficacy and vice versa.

**(7) Reciprocal relations between internal and external WFC and irritation.**

As a last differentiating aspect that discriminates the dissertation's model from others is that it includes *reciprocal effects* between internal and external WFC and health-related consequences which have been neglected in existing research. According to COR theory, loss spirals can occur because individuals who have already lost resources and therefore have fewer resources than normally are more prone for future losses of resources. Thus, on the one hand, the dissertation model predicts that experiences of external and internal WFC induce resource loss and therefore increases stress. But, on the other hand, it could also be the case that experiences of stress consume resources, therefore fewer resources are available for the integration of work and family demands - psychologically or internally as well as behaviorally or externally - and consequently the individual experiences more WFC. This is in line with existing research results regarding similar variables, which found reciprocal effects (cf. Demerouti et al., 2004; Innstrand et al., 2008), but, in contrast to Study III, existing research made no differentiation between external and internal WFC and did not consider irritation.

Figure 3 summarizes the comprehensive model including all considered variables that will be investigated in the following three studies.

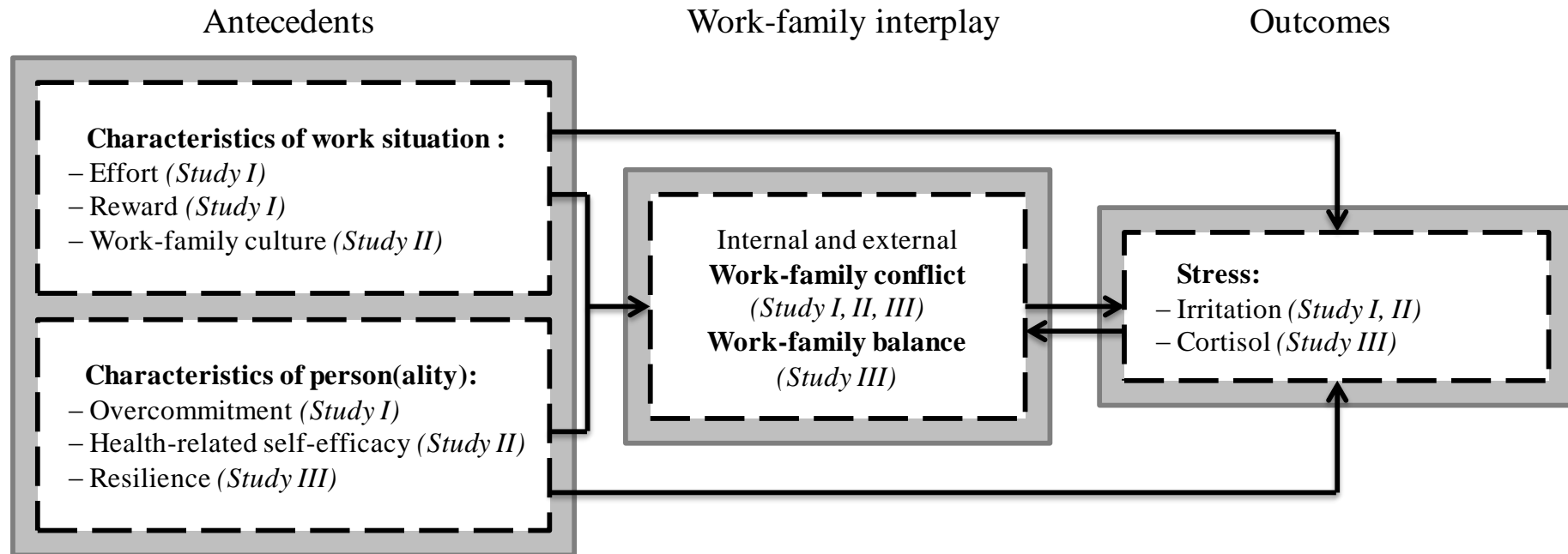


Figure 3. The dissertations' model of cause-and-effect relationships with regard to the role of work-family interplay and stress.

# **3. Study I: Effort-Reward Imbalance Theory and Irritation: The Important Role of Internal and External Work-Family Conflict**

## **3.1 Introduction**

In times of constant changes, workplace insecurity, and ever more severe demands, people need some stability to stay healthy and to recover. Many people are looking for this stability in family life and therefore seek to combine both work demands and family obligations successfully. In general, this means having to master the challenge of work-family integration in the changing world of work (Allen, Herst, Bruck, & Sutton, 2000; Glass & Finley, 2002). A blend of social roles and demands goes along with the double-occupation within a work and a family context. However, dealing with such a conglomerate of social roles and demands can have negative as well as positive health consequences (see Carlson & Frone, 2003; Frone, 2003; Greenhaus & Allen, 2011; Kristensen, Smith-Hansen, & Jansen, 2005; Mullen et al., 2008; Ulich & Wiese, 2011; Weinberg & Cooper, 2011). Both in science and practical human resource management, work-family aspects such as WFC and mental health are perceived as related to each other. For example, several studies have shown that the interference of work with family life induces lower psychological well-being (Frone, 2003; Greenhaus & Allen, 2011, Greenhaus, Allen, & Spector, 2006; Mullen et al., 2008). Consequently, many organizations invest in family-friendly policies and culture to trigger positive (health) effects and commit their high-potentials to the company (see Krisor, Rowold, Borgmann, & Krüger, 2011; Thompson & Prottas, 2005).

Though highly relevant, the relationship between WFC and mental health is seldom reflected in the framework of a general mental health model of occupational psychology. Thus, the impact of WFC on employees' health in relation to other important mental health predictors still constitutes a gap in research. This study investigates an overall model which regards WFC as an intermediary variable between the independent variables of a classic mental health model (the effort-reward imbalance model by Siegrist, 1996), and irritation as a dependent variable (cf. Frone et al., 1992;

Kristensen et al., 2005). The use of an overall model bears one important advantage: the relevance of WFC for mental health can be evaluated with regard to psychosocial working conditions such as job characteristics as well as personal characteristics, thus integrating relationships assumed highly relevant for a better understanding of WFC. Mostly these relationships have been investigated separately and have not been integrated into one overall model (cf. Bakker, ten Brummelhuis, Prins, & van der Heijden, 2011; Baltes, Zhdanova, & Clark, 2011). Hence, this study's aim is to broaden a mental health theory through the integration of the construct of WFC.

When investigating WFC in the context of a general mental health model, two classic and predominant models have to be taken into account: 1) the demand-control (DC) model by Karasek (1979), and 2) the ERI model by Siegrist (1996). In these, even though both authors discussed the integration of role conflicts such as WFC, they did not explicitly integrate it into their models.

According to the DC model, psychological strain is caused by the combination of high job demands and low job control (Bakker & Demerouti, 2007; Karasek, 1979; Preckel, Meinel, Kudielka, Haug, & Fischer, 2007; Theorell, 1998). Butler, Grzywacz, Bass, and Linney (2005) applied the DC model to WFC and found that demands increased WFC and control decreased WFC.

In any event, they did not test an overall model which included a mental health indicator as a criterion variable. Despite empirical evidence, the DC model lacks personal demands and resources. In recent research there is a call for the integration of dispositional characteristics and personal resources in relation to WFC (Greenhaus et al., 2006). As a result of this, the ERI model is used in this study because WFC is influenced by work as well as by family and personal characteristics (see Amstad et al., 2011; Bakker et al., 2011). As mentioned above, WFC itself has impact on mental health (Amstad et al., 2011). And additionally, the work and family characteristics also have direct influence on mental health.

In contrast to the DC model, the ERI theory claims that a combination of high efforts (e.g., work performance) and low rewards (e.g., career opportunities, monetary or social esteem) impairs employees' physical and mental health (Rödel, Siegrist, Hessel, & Brähler, 2004; Siegrist, 1996, Siegrist, 2011; Theorell, 1998; Tsutsumi &

Kawakami, 2004; van Vegchel et al., 2005). Moreover, it includes a personal characteristic, namely OC, which probably shares in the relationship mentioned above. This personality trait describes employees who are overly committed to their job and thus invest many resources (time, thoughts, etc.) at work - while actually working as well as in their leisure time. In the theoretical framework of ERI, a few researchers have begun to integrate WFC (see Franche et al., 2006; Kinman & Jones, 2008; Willis et al., 2008). For example, Franche et al. (2006) tested a comprehensive model that included inter alia the effort-reward ratio (as independent variable), work-family spillover (as intermediate variable), and depressive symptoms (as dependent variable). They found direct and indirect effects in a very specific sample, which consisted of female employees working in the health-care sector. In contrast to the present study, they used the ERI ratio, and OC was not included in their model. Furthermore, none of these studies has investigated an overall model with OC as personal characteristic and irritation as dependent variable.

In conclusion, in view of the need for more research examining job characteristics as well as personal characteristics in relation to WFC (cf. Bakker et al., 2011; Franche et al., 2006) and mental health, the present study focuses on the ERI model as it integrates all of these aspects. Thus, to extend previous research, it is tested whether internal and external WFC act as a mediator between the three ERI aspects (effort, reward, and OC) and irritation in one overall model.

### **3.2 Theoretical Background**

The ERI theory is based on the social exchange principle (Siegrist, 2002). Thus, if people put a lot of effort and energy into their work (and maybe more than they should give with regard to other responsibilities they have), they expect appropriate compensation. If this expectation is not fulfilled, they become dissatisfied, and, over a longer period, their health statuses suffer (*extrinsic ERI hypothesis*). Additionally, the *intrinsic ERI hypothesis* proposes that a high level of overcommitment – a personality trait that depicts someone who is strongly committed to his/her work-tasks and tends to overspend professionally – decreases the health statuses of employees (Rödel et al., 2004; van Vegchel et al., 2005). Thus, if someone has to solve work problems in his leisure time and therefore cannot unwind, regeneration and mental health are neglected. Furthermore, the combination of high ERI with high OC results in even poorer health

(*interaction ERI hypothesis*; Kinman & Jones, 2008; Preckel et al., 2007; van Vegchel et al., 2005).

Van Vegchel et al. (2005) raise the question of how both effort and reward do influence employees' health independently of each other. Preckel et al. (2007) found that all aspects of the ERI theory have an impact on different mental health indicators, but that effort and reward separately have an even bigger impact than their ratio. Further, previous studies have shown that efforts and rewards influenced WFC independently of each other. For example, long working hours, which are one aspect of efforts, increase WFC (Ford, Heinen, & Langkamer, 2007; Höge, 2009; Major, Klein, & Ehrhart, 2002). Thus, the first step in this study is to examine the impact of all predictor variables of the ERI model independently of each another. Thereby, the study contributes to a better understanding of each ERI variable in the work-family as well as the mental health context.

### **The effort-reward imbalance theory in relation to irritation**

Some researchers have already investigated the relation between the effort-reward ratio and different health outcomes; for example, concerning the first (extrinsic) assumption, Franche et al. (2006) found that the effort-reward ratio related to depressive symptoms in a sample of female employees. Further, a meta-analysis by van Vegchel et al. (2005) showed that results of most studies acknowledge the extrinsic ERI assumption in relation to general mental health outcomes. The present study moves a step forward by integrating all aspects of the ERI theory into a broader model of mental health.

As mentioned above, the present study investigates the relationship between all the ERI components and irritation, an important indicator of psychological strain. Irritation is a work-related, subjectively perceived emotional and cognitive strain, which is the result of an imbalance between one's own resources and daily stresses (Mohr, Rigotti, & Müller, 2005b). Thus, it is an impairment of mental health which can be located between actual stress and mental ill-health (Mohr et al., 2005b). Irritation arises as a consequence of perceived goal discrepancy (Müller, Mohr, & Rigotti, 2004). It relates to both psychosomatic complaints and to physiological stress indicators such as cortisol (Mohr, Müller, & Rigotti, 2005a). The concept of irritation has been used



within numerous studies in different countries (cf. Mohr et al., 2006; Mohr et al., 2005b, Müller et al., 2004; Rotheiler & Metz, 2003), but to the author's knowledge, this variable has not been investigated in the context of the complete ERI model yet. Nevertheless, efforts are defined as demands and obligations (Siegrist, 2002). For example, constant time pressure, many interruptions and the permanent increase of demands are included in this definition. If these efforts are too high, they increase psychological strain (cf. Siegrist, 1996). Further, these efforts obstruct goal attainment. Therefore, efforts are assumed to relate positively to irritation. Höge (2009) found that time pressure, which is one aspect of efforts, increased emotional and cognitive irritation. Additionally, Berset, Elfering, Lüthy, Lüthi, and Semmer (2011) found that time pressure was positively related to rumination, which is the cognitive aspect of irritation. Further, Preckel et al. (2007) found that efforts were negatively related to mental health and related positively to vital exhaustion and depressed mood. Thus, using irritation as a negative mental health indicator, a positive relationship with efforts is hypothesized.

Further, rewards are defined as “money, esteem and career opportunities” (Siegrist, 2002, p. 264). In contrast to job insecurity, which relates positively to psychological strain, rewards are assumed to be negatively related to irritation (cf. Siegrist, 1996). This negative relationship to irritation is assumed because “rewards consist of the perceived adequacy of salary or wage, promotion prospects, job security, and esteem in which the worker is held by supervisors and colleagues” (Preckel et al., 2007, p. 92). This perceived equity of the cost-benefit relationship strengthens employees' insight into the link between reward and the achievement of objectives and should therefore reduce irritation. Preckel et al. (2007) found that rewards were positively related to mental health and negatively related to vital exhaustion and depressed mood. Thus, it is assumed that rewards are also negatively associated with irritation.

With respect to the intrinsic OC hypothesis, van Vegchel et al. (2005) found largely consistent results showing that OC decreases mental health outcomes. Concerning irritation, Rotheiler and Metz (2003) found a high positive correlation with OC. Mohr et al. (2006) also described OC as being principally related with cognitive irritation. According to Müller et al. (2004), cognitive irritation can occur together with

work engagement to increase the probability of the achievement of objectives. In contrast, emotional irritation leads to lower work engagement through negative emotions and thoughts, which increase the disengagement from the goal to be achieved. Even if OC has a stronger impact on cognitive irritation than on emotional irritation with regard to the overall concept of irritation in terms of work-related psychological strain, it is assumed that someone who is overcommitted to his occupational goals feels stressed if his achievement of goals is threatened. Thus, taking all aspects of the ERI theory into account the following hypothesis is proposed:

*H1: Effort (H1a) and OC (H1b) have positive relationships with irritation, while reward has a negative relationship (H1c).*

### **Work-family conflict in relation to irritation**

As described above, many employees face the challenge of meeting the expectations of their work and family roles. Researchers of the work-family domain distinguish between negative as well as positive effects from work to family and from family to work (see Carlson & Frone, 2003; Frone, 2003; Greenhaus & Allen, 2011; Mullen et al., 2008; Ulich & Wiese, 2011; Wiese, Seiger, Schmid, & Freund, 2010). Thus, each domain can influence the other: work can impair or facilitate family, and vice versa (Frone, 2003; Greenhaus & Allen, 2011; Mullen et al., 2008). Amstad et al. (2011) showed in their meta-analysis that work interference with family relates more strongly to psychological strain and to work-related stress than family interference with work. Hence, this study will concentrate on the direction of WFC. Following the theoretical concept of Carlson and Frone (2003), work-to-family conflict (WFC) means that work-related role demands interfere with demands in family life. According to Siegrist (1996), these social roles interfere with each other. Thus, WFC can be defined as the interruption of family roles by work roles – an inter-role conflict emerges (see Greenhaus & Beutell, 1985). Carlson and Frone (2003) further distinguish between internal and external conflicts within WFC. Internal conflicts are caused by psychological aspects, e.g., worrying about work problems while caring for the children at home. In contrast, external conflicts are based on behavioral conflicts, such as if someone has to do extra hours at work although he/she has to pick up his/her children from the kindergarten.

Despite this conflict aspect, these crucial social roles “help to define who we are” (Frone, 2003, p. 143) and thus are very important for our self-concepts and self-evaluations. The integration of work and family roles may be successful, but it is also often stressful and therefore potentially deleterious to employees’ health (Frone, 2003; Kristensen et al., 2005; Weinberg & Cooper, 2011). According to Siegrist (1996), irritation can be triggered “[...] if the continuity of crucial social roles is interrupted [...]” (p. 30). Taking the achievement of objectives into account, this experience of a discrepancy between actual performance and goal performance leads to irritation (Müller et al., 2004). Precisely, it induces rumination and increasing performance efforts (cognitive irritation) or verbal-aggressive behavior (irritability) and goal disengagement (emotional irritation; Müller et al., 2004). If someone has important goals for his life in more than one life-domain, it is likely that some of these goals will be in competition with each other. The greater the number of goals someone sets for himself is, the more probable it is that some of them will prove not to be fully achievable (cf. role theory; Mullen et al., 2008). Thus, it is assumed that both internal and external WFC lead to irritation, because both aspects of WFC indicate different aspects of goal respectively role conflicts.

In a study conducted in Turkey, Mohr et al. (2006) found that work-family overload was related to both aspects of irritation. These study results were only described by correlations and are limited in the international scope. Additionally, Höge (2009) found a positive relationship between WFC and both cognitive and emotional irritation. These results are restricted to a sample of female nurses. Furthermore, Müller et al. (2004) found that negative work-home interaction correlated with cognitive and emotional irritation as well as with the overall index. These authors investigated a heterogeneous sample but described only correlations and - in accordance with the other studies mentioned - did not differentiate between external and internal WFC. Therefore, because the relation between internal and external WFC and irritation has not yet been sufficiently investigated and more research is needed to close this gap, the following hypothesis is proposed:

*H2: External (H2a) and internal (H2b) work-family conflicts have positive relationships with irritation.*

### **The effort-reward theory in relation to work-family conflict**

“Work [...] demands are the dominant cause of WIF [work interference with family life]” (Greenhaus et al., 2006, p. 64). Thus, if someone has to put a high level of efforts into his/her work, it is likely that he/she will have to work longer and in consequence experience external WFC, or that he/she will be cognitively solving job problems at home and thus experiencing internal WFC (cf. Kinman & Jones, 2008). Further, it is assumed that rewards at work reduce both types of WFC, because rewards are a compensation for a finished job (Ross & Mirowsky, 1996). According to the WFC definition by Greenhaus et al. (2006, p. 63), “work-family conflict occurs when experiences in a role interfere with meeting the requirements and achieving effectiveness in the other role”. Rewards act as signals to the employee that he can be satisfied with his work (and thus has met the requirements of the work) and therefore does not have to work extra hours (external WFC) or think about work issues at home (internal WFC), which in turn should lower WFC. Moreover, if someone is overcommitted to his/her work, he/she will - according to his/her personality traits - invest much external and internal effort into his/her work and thus have less capacity for his family life. Therefore, OC is assumed to strengthen WFC (cf. Kinman & Jones, 2008).

In addition to the study of Franche et al. (2006), which was described in the introduction, Kinman and Jones (2008) found main effects of effort and reward on WFC. Their results showed a positive effect of OC on WFC in a sample of university employees. Willis et al. (2008) found a significant influence of effort on WFC in a longitudinal study of police employees. Thus, indicators as well as methods, samples, and results differed from each other. The implications of these three studies are limited to very specific groups of employees. None of these studies differentiated between external and internal conflicts. The present study will close this research gap and investigate this differentiation for the first time using a heterogeneous sample. Hence, it is assumed that:

*H3: Effort (H3a) and OC (H3b) have a positive relationship with (both external and internal) WFC, while reward (H3c) has a negative relationship.*

In Figure 4, the complete model of Hypotheses 1-3 is depicted. This structure of the model is similar to the basic model for WFC described by Kristensen et al. (2005). To the authors' knowledge, this full model has not yet been empirically tested.

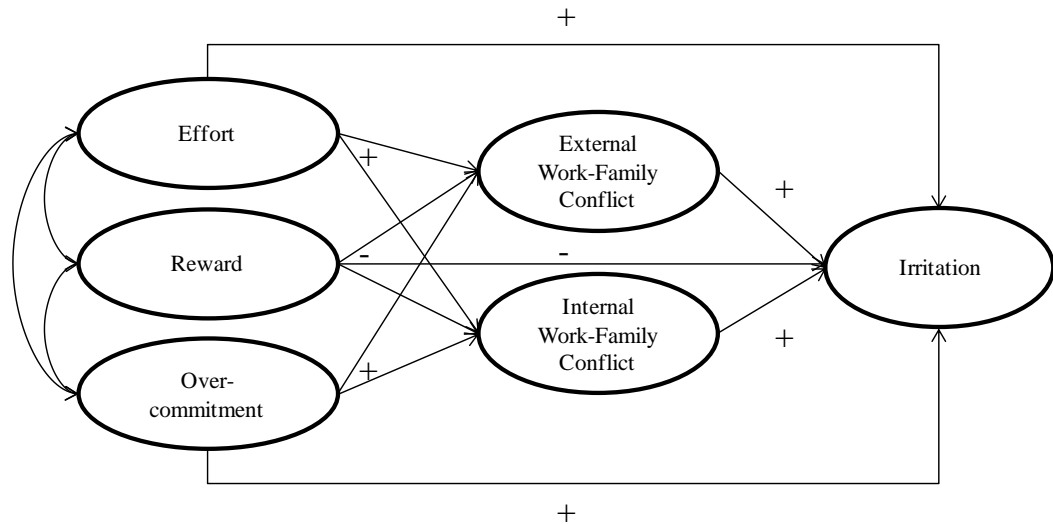


Figure 4. Hypothesized model of Study I.

### The ERI-OC-types in relation to work-family conflict and irritation

Until now, the effect of the combination of ERI with OC on WFC and irritation has been neglected. As described above, Franche et al. (2006) tested ERI in relation to WFC and depressive symptoms but again without considering OC. Kinman and Jones (2008) studied the intrinsic interaction hypothesis in the work-family context for the first time. They found significant but – in relation to the other variables – weak effects of interaction between effort, reward, and OC on WFC. A mental health indicator was not tested in this study.

Siegrist (cf. 1996; 2009; 2011) did not explicitly define the statistical meaning of an interaction between ERI and OC (van Vegchel et al., 2005). He “does not specify whether the interaction hypothesis refers to additive main effects or to a synergistic effect that increases the risk of adverse health outcomes beyond simple additive effects. In translating these propositions into testable statistical hypotheses” (Preckel et al., 2007, p. 93), there are different possible ways of variable testing (cf. Franche et al., 2006; Kinman & Jones, 2008; Preckel et al., 2007; Vrijotte, van Doornen, & de Geus, 1999; Willis et al., 2008). This hypothesis is named “interaction hypothesis”. Precisely

it means “relatively higher risks of reduced health are expected in people who are characterized by conditions (1[ the extrinsic ERI hypothesis]) and (2[ the intrinsic ERI hypothesis])” (Lau, 2008, p. 1). Thus, someone who experiences high levels of ERI and high levels of OC should have a lower mental health status than people in all other possible conditions within this framework. Consequently, the present study uses a combination of OC and ERI to propose four different types of employees who experience high versus low ERI and OC, respectively (ERI-OC-types, see Figure 5).

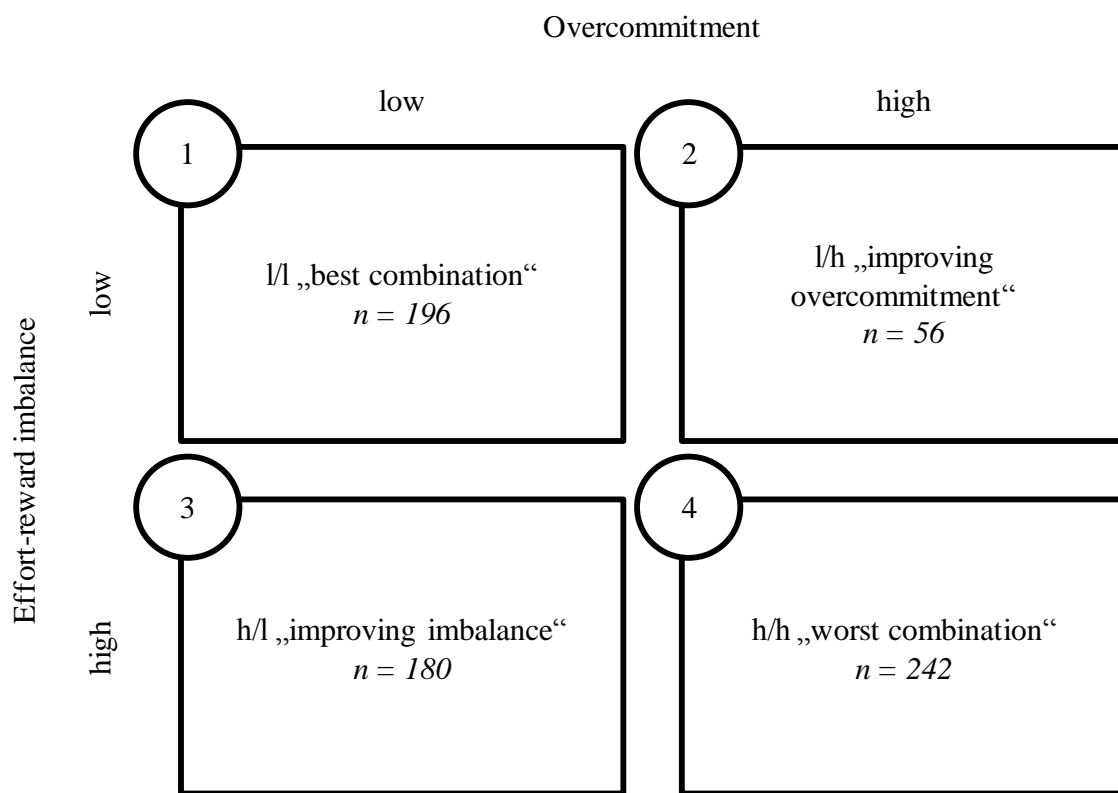


Figure 5. The four ERI-OC-types of Study I. l = low; h = high.

One possible advantage is that translating the interaction process into types may generate several implications for practical human resource management. This is indicated in Figure 5. If someone displays a good ratio between efforts and rewards at work and is not overly committed to his work (type 1), he/she should have both lower WFC and lower irritation than someone who perceives low rewards in proportion to high efforts and is concurrently highly committed to his job (type 4). If these hypotheses were true, the concluding implication would be to maintain a type 1-status or to learn

how to become a type 1. In the case of type 4 the assumption is congruent with the intrinsic interaction hypothesis in relation to mental health. In relation to WFC it is proposed that such a type of person will, based on his OC to work, try to reach his reward (which he considers desirable and justified) through working even harder, and thus will neglect family responsibilities. Because type 1 and 4 are the most conflicting types and it is assumed that they are most important for mental health, this study will concentrate on these types. Thus, *Hypothesis 4* is:

*H4: There are differences between the ERI-OC-types of employees in relation to irritation (a), external (b), and internal work-family conflict (c), so that employees who are characterized by a combination of high ERI and high OC (type 4) experience higher levels of irritation as well as external and internal work-family conflict than employees who are characterized by a combination of low ERI and low OC (type 1).*

### **3.3 Method**

#### **Study design**

An effort was made to gain a heterogeneous sample of employees from various organizational settings plus a company-independent sample. All participants received a self-report questionnaire with a similar set of items. In each case, the survey was voluntary as well as anonymous.

In all companies the procedure was part of an employee survey aiming at the evidence-based development of company-specific mental health interventions. Except for one organization, the survey's procedure and aim were introduced and explained to the company leaders in their localities by the same researcher. In the other organization an informed student assistant organized the procedure.

First, a travel company was recruited (n = 358). Additional interviews with the management directors about organizational health, and one workshop with employees and works councils were conducted here. Furthermore, the survey was introduced and communicated in the employee magazine. The survey was conducted in June 2010. Most employees worked in a call-center. The others worked in the postal logistics or at airports in Germany. Only a few employees were given paper-pencil-versions of the

questionnaire. The others were invited to complete the online questionnaire via e-mail. The response rate was 63.3 %.

Two more samples were based on employees working in the health-care sector. In the care facilities sample (n = 113) the survey was conducted in October 2010; most employees were nurses. In the psychiatry sample (n = 63) the survey was conducted in November 2010; this sample consisted of psychiatrists, nurses, and administrative employees. All these employees were given paper-pencil-versions of the questionnaire. They were informed about it by their superiors and through information on their notice boards. Employees of both organizations were not used to staff surveys, which probably explains lower response rates for these samples: In care facilities the response rate was 31 %, in the psychiatry sample it was 46 %.

In order to get a more company-independent and more heterogeneous sample, an additional snowball-sample (n = 93) was recruited through personal contacts and numerous internet forums. The survey was carried out online via an internet website in March 2010. Participants were guaranteed that all captured data would be treated anonymously and that their participation would be voluntary. To encourage participation, respondents were given the chance to win prizes in a lottery.

### **Participants**

Summarizing the final sample, 627 employees of different organizations in Germany participated in this study. The largest proportion (57 %) worked at a travel company, 28 % worked in two organizations in the health-care sector (18 % in care facilities and 10 % in psychiatry). A further 15 % of the participants were recruited by a snowball procedure. Of these employees, 63 % worked full-time and 28 % had leadership responsibilities. The majority (74 %) of the respondents were female. The age groups were: under 31 years, between 31 and 40 years, and between 41 and 50 years, each of which accounted for some 30 % of the sample, leaving only 9 % aged over 51 years. 58 % had no children, 24 % had one, 15 % had two, 2 % had three, and 1 % had more than three children. In this sample, 23 % had elder care responsibilities. Thus, results of this study are based on a diverse sample, which included employees with children and without children as well as employees with elder care responsibilities.



## Measures

*Effort, reward, effort-reward imbalance and overcommitment* were measured with a short-form of the ERI-questionnaire (Siegrist et al., 2009). Effort was measured using three items and reward was measured using seven items. These ten items were utilized for calculating ERI. More precisely, imbalance was calculated by the quotient of effort sum score (e) divided by the reward sum score (r). Because of the unequal number of items, the reward sum score was corrected by the adjustment figure represented by the number of effort items divided by the number of reward items (c). Hence, ERI was calculated by the following formula:  $ERI = e/(r*c)$  (see Lehr, Koch, & Hillert, 2010; Willis et al., 2008). One effort item example is “I have constant time pressure due to a heavy work load”. One reward item example is “Considering all my efforts and achievements, my job promotion prospects are adequate”. OC was measured by six items (e.g., “As soon as I get up in the morning I start thinking about work problems”). On a five-point Likert-scale respondents were asked to indicate whether they more or less *strongly disagree* (1) or *strongly agree* (5). Cronbach’s alpha for effort was .71, for reward .70 and for OC .77.

*Work-family conflict.* The twelve items measuring WFC and FWC originally derive from Carlson and Frone (2003). In the present study a German version developed by Wiese (see Seiger & Wiese, 2009) was used. WFC is measured internally and externally with three items in each case. One sample question for internal WFC is “When you are at home, how often do you think about things you need to accomplish at work?” An example for external WFC is “How often does your job or career keep you from spending the amount of time that you would like to spend with your family?” On a five-point Likert-scale respondents were asked to indicate how often they more or less experience WFC: *never* (1) or *always* (5). Cronbach’s alpha for external WFC was .80, and for internal WFC .69.

*Irritation* was assessed with the Irritation Scale (Mohr et al., 2005a). This scale assesses cognitive and emotional demands at work and indicates mental health impairment. The scale consists of eight items. Three items measure cognitive irritation (e.g., “Sometimes even on vacation I have to think about problems at work.”) and five items measure emotional irritation (e.g., “I am quickly annoyed.”). On a seven-point Likert-scale respondents were asked to indicate if the items are more or less true on a

scale ranging from: *not correct at all* (1) to *completely correct* (7). The internal consistency for the total-scale is .88, which is in line with other studies (see Mohr et al., 2005).

### **Analytical strategy**

Structural equation modeling using IBM SPSS Amos 19 tested Hypotheses 1-3. All latent variables were operationalized by three parcels using the distributed parceling strategy (see Bandalos, 2002). The only exception was the operationalization of irritation. As mentioned above, irritation consists of emotional and cognitive aspects. On the basis of this underlying assumption and following the isolated parceling strategy, two parcels indicated irritation (see Hall, Snell, & Singer Foust, 1999). In the hypothesized model, no correlation between error variances was specified. In the case of the independent variables (effort, reward, and OC), covariances between all variables were assumed. The assessment of normality of distribution showed that univariate normality was given because – with exception of the emotional irritation parcel (skew = 1.01) – all skew and kurtosis values were under 1 (see Temme & Hildebrandt, 2009). However, multivariate normality – the basic requirement for the maximum likelihood (ML) estimation – was not given because the multivariate critical ratio was above 1.96 (i.e. 2.57). Nevertheless, in accordance with methodological literature, ML estimation was used for parameter estimation. To avoid overestimation of results (see Curran, Finch, & West, 1996) and to ensure accuracy of the results in this study, the bootstrap method (see Byrne, 2004; Enders, 2001; West, Finch, & Curran, 1995) was used additionally. “One approach to handling the presence of multivariate nonnormal data is to use a procedure known as “the bootstrap”. [...] The considered advantage of this approach is that it allows the researcher to assess the stability of parameter estimates and thereby report their values with a greater degree of accuracy” (Byrne, 2004, p. 82). On this basis, test statistic p values and parameter standard errors with ML bootstrap resampling and a 90 % confidence level were estimated (see Nevitt & Hancock, 2001). The Standardized Root Mean Square Residual (SRMR), which should be below .08, describes the absolute model fit (Hu & Bentler, 1999). Further, the goodness-of-fit (GFI), adjusted GFI (AGFI) and comparative fit index (CFI) will be reported. Additionally, the normed fit index (NFI) is an indicator in relation to the model comparison between the default and the independence model. With regard to

these fit-indices, a value above .90 indicates good model fit (see Byrne, 2001; Hu & Bentler, 1998). Further, Root Mean Square Error of Approximation (RMSEA) was used. A value lower than .06 indicates a good model fit (Hu & Bentler, 1999).

*Hypothesis 4* was tested by dividing the sample into four groups of possible high/low ERI and high/low OC types of employees (see Figure 5). In order to assign each participant to one of the four groups, respectively, cut-off scores were utilized as thresholds: First, values for  $ERI > 1$  were defined as ‘high’,  $ERI < 1$  were defined as ‘low’; likewise, values for  $OC > 16$  were defined as ‘high’, and values for  $OC < 16$  were defined as ‘low’, respectively (for detailed information about cut-off scores see Lehr et al., 2010; van Vegchel et al., 2005). Further analysis regarding group differences was implemented by using multivariate analysis of variance (MANOVA). Because of different group sample sizes, the multivariate general linear model was used (see Sedlmeier & Renkewitz, 2008). According to Cohen (1988),  $\eta^2 = .01$  constitutes a small,  $\eta^2 = .06$  a medium and  $\eta^2 = .14$  a large effect.

All data were gathered from a single source, therefore it was tested for common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff & Organ, 1986). Hence, Harman’s one-factor test was used. The unrotated factor analysis results found that there were several factors with an eigenvalue above 1.0 each. Therefore, no general factor indicating common method bias had proven.

## **3.4 Results**

### **Descriptive statistics**

Table 1 shows the internal consistencies, means, standard deviations, and correlations of all variables. As described above, all scales had good reliability with Cronbach’s alpha coefficients exceeding .70 (Nunnally & Bernstein, 1994). The ERI and OC means were slightly above the cut-off scores that were described within the analytical strategy of *Hypothesis 4*. The means of external and internal WFC were roughly on the same level. The mean irritation sum score was 22.6, which equated to a percentile ranking of 47, an average value (see Mohr et al., 2005a). All correlations were in line with the hypotheses.

Table 1

*Correlations, Means, Standard Deviations and Internal Consistencies for the Study Variables of Study I*

Variables	M	SD	1	2	3	4	5	6	7	8
1. Gender	1.26	0.44	/							
2. Effort	3.69	0.94	ns	(.71)						
3. Reward	3.12	0.72	ns	-.24**	(.70)					
4. Effort-reward imbalance	1.28	0.56	ns	.72**	-.75**	/				
5. Overcommitment	16.23	5.08	ns	.39**	-.24**	.39**	(.77)			
6. External Work-Family Conflict	2.35	0.70	ns	.23**	-.24**	.28**	.34**	(.80)		
7. Internal Work-Family Conflict	2.41	0.62	.14	.23**	-.13**	.21**	.55**	.50**	(.69)	
8. Irritation	2.83	1.25	ns	.29**	-.30**	.38**	.60**	.36**	.52**	(.88)

*Note.*  $N = 627$ . \*\* = .01 two-tailed. ns = not significant.

### Results of Hypotheses 1-3

In accordance with the recommendation of Anderson and Gerbing (1988), first the measurement model and, in a second step, the structural model was tested. As indicated by the fit indices of the measurement model, empirical data fitted well to the proposed theoretical factorial structure (SRMR = .05, GFI = .95, AGFI = .92, NFI = .93, CFI = .96). Then the model fit for the structural model to investigate the relationships between effort, reward, OC, and internal and external WFC as well as irritation was estimated. The goodness-of-fit indices indicated good model fit (SRMR = .05, GFI = .95, AGFI = .92, NFI = .93, CFI = .96). Also, the model showed high squared multiple correlations for the dependent variables (irritation: .75, internal WFC: .71 and external WFC: .26), thus the predictors in the model explained good proportions of variance of these variables. A closer look at the results revealed that *Hypothesis 1* was partially supported. Effort (H1a;  $\beta = -.07, p = .15$ ) and reward (H1c;  $\beta = -.09, p = .05$ ) did not have significant direct influence on irritation. In contrast, OC (H1b) was positively ( $\beta = .54, p = .00$ ) related to irritation. Further, *Hypothesis 2* was also partially supported because external WFC (H2a) was not associated with irritation ( $\beta = .05, p = .28$ ). Nevertheless, internal work-family (H2b) conflict was positively related to irritation ( $\beta = .35, p = .00$ ). In relation to *Hypothesis 3*, effort (H3a) had no influence worth mentioning on internal ( $\beta = -.01, p = .85$ ), but on external ( $\beta = .13, p = .04$ ) WFC. OC (H3b) was positively related to external ( $\beta = .31, p = .00$ ) and internal ( $\beta = .88, p = .00$ ) WFC. Moreover, reward (H3c) had a positive effect on internal WFC ( $\beta = -.13, p = .00$ ), but a negative effect on external WFC ( $\beta = -.21, p = .00$ ). Thus, *Hypothesis 3* was partially supported. Figure 6 summarizes these results. Additionally, the standardized indirect effect of OC on irritation was significant with .32 ( $p = .00$ ), in contrast to the indirect effects of reward and effort, which were not significant. Therefore, the relationship between OC and irritation was mediated through WFC.

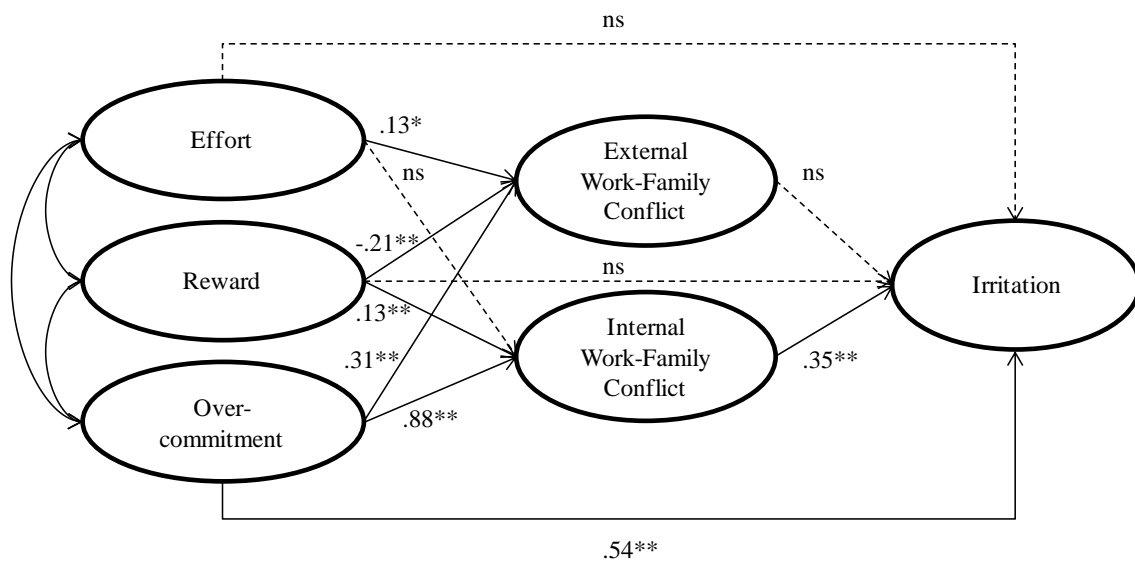


Figure 6. Summarized SEM results of Study I. \* = .05. \*\* = .01. ns = not significant.

#### Results of Hypothesis 4

To test possible effects of the ERI-OC-types on the outcome variables internal and external WFC and irritation respectively, MANOVA was used. Figure 5 shows the definition of each type. With regard to these four types, this study found 169 employees of type 1, 56 employees of type 2, 180 employees of type 3 and 242 employees of type 4 in this sample. The significant multivariate Box-M-Test ( $Box's M = 67.95, F = 3.73, p = .00$ ), which assesses equality of variance-covariance-matrices of the independent variables (Kruskal & Wallis, 1952; Stevens, 1986), indicated heterogeneous variance-covariance matrices between the groups. Further, the Levene test, which assesses the equality of error variances in different samples, was significant in the case of irritation, thus conservatively an alpha level of .01 was defined. Additionally, due to the non-normal multivariate distribution of the irritation and WFC scores, the non-parametric Kruskal-Wallis test was used. This test indicated group differences in relation to irritation ( $\chi^2 = 169.81, df = 3, p = .000$ ), external WFC ( $\chi^2 = 62.48, df = 3, p = .000$ ) and internal WFC ( $\chi^2 = 157.31, df = 3, p = .000$ ). By the four ERI-OC- types,  $\eta_p^2 = .27$  of irritation,  $\eta_p^2 = .10$  of external WFC, and  $\eta_p^2 = .25$  of internal WFC were explained. Thus, in line with Cohen (1988), this study found strong effects of these types for irritation and internal WFC. The Games-Howell Post-Hoc test showed that, in relation to irritation, only type 1 and 3 did not differ significantly, while all other types did. In relation to external WFC, types 1 and 2, as well as 2 and 3, did not significantly differ.

And in the case of internal WFC, types 1 and 3, as well as 2 and 4, did not differ at all. Thus, types 1 and 4 in every analysis were different from each other (see Figure 7). Thus *Hypothesis 4* was confirmed.

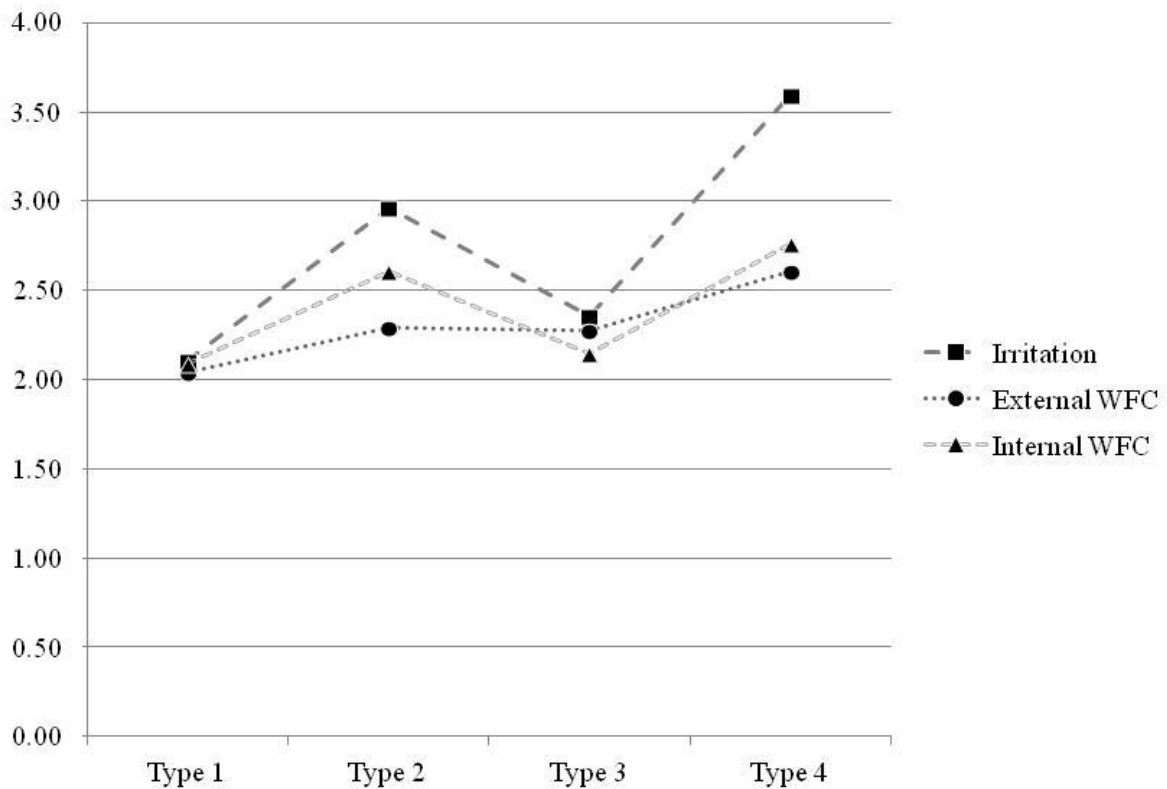


Figure 7. The ERI-OC-types in relation to the dependent variables of Study I.

### 3.5 Discussion

This study is an example for the successful integration of WFC in a general and predominant model of mental health. The study shows the importance of OC in relation to negative effects of WFC and irritation in a heterogeneous sample. Another contribution of this study is the differentiation of internal and external WFC, which was important for an accurate evaluation of their relationship to the other variables mentioned above.

Summarizing the study results, it can be concluded that within the framework of the three ERI components, WFC is an important mediating variable concerning irritation. In the study's model, OC has the biggest impact on external and internal WFC

as well as on irritation. In addition, internal WFC has important impact on irritation. Taking the ERI-OC-types into account, a combination of high ERI - high OC impairs both aspects of WFC and irritation compared to outcomes of a low ERI - low OC combination type.

As proposed in *Hypothesis 1*, results of this study show a positive relationship between OC and irritation, whereas in the case of effort no significant effect could be obtained and a direct negative effect between rewards and irritation was significant on the 10 % significance level. These findings are in line with earlier results (Preckel et al., 2007), which found weaker impact of effort in relation to reward when using the variables independently in the analysis. Regarding effort, an exponential connection might be more appropriate, because it is not effort per se but too much effort that should increase irritation. However, in Preckel et al.'s study (2007) reward had an even bigger impact on several health indicators than OC. It may be that the extremely high impact of OC on irritation (as well as on internal WFC) is caused by some conceptual overlap. Cognitive irritation is characterized by rumination on work-related problems. This is also some aspect of OC and WFC. Indeed, one item is nearly identical in all three concepts. In any case, despite this overlap, all variables explain unique variance in irritation. The results of this study are in line with the study conducted by Höge (2009), which found that “concepts of cognitive irritation and work–family conflict can be distinguished theoretically” (p. 46) and empirically. The coincidence of these three variables named above is both a limitation and a strength of this study. It is a limitation because these constructs are interconnected by definition and item similarity (e.g., rumination aspects) and, for this reason, are not fully distinct. Still, the strength of this study is that this model, which contains OC, and internal and external WFC as additional components, was statistically validated. In consequence, results confirm not only a theoretical but also an empirical distinction of the constructs. Thus, it is concluded that it is important to investigate similar constructs and their impact on other variables in order to discover their similarities and differences even more clearly. Hence, future research should try to exactly identify the predominant aspects of OC, WFC, and irritation.

With the separation of internal and external WFC this study has taken the first step in the right direction to more detailed insights, which is another important strength.



According to the results of *Hypothesis 2*, only internal and not external WFC intensifies irritation. Thus, it is not the WFC per se but it is primarily the psychological role conflict that increases mental strain. Hence, even if it is impossible for someone to successfully organize and satisfy all requirements on the behavioral level, this does not have a detrimental effect on mental health by itself. Any effects which may result rather depend on the individual's personal expectations and goals and level of success he perceives in fulfilling them.

The influence of OC, effort, and reward on WFC was the content of *Hypothesis 3*. Findings indicate that effort increases external but not internal WFC. This fits the argumentation above. More efforts induce the need for more or better organization and can thus lead to higher behavioral conflict (external WFC), but if one's own priorities are well-considered with regard to the personal aspiration level and correspondingly organized, efforts have no influence on internal WFC (or on irritation). In contrast, while reward lowers external, it (against the proposed direction of the hypothesis) strengthens internal WFC. If the work setting is rewarding and employees perceive that they have done their work well, they can go home and do not have to work extra hours. In consequence, thus their external WFC lowers. Concerning internal WFC, results could be an expression of the motivational component of a rewarding work setting. While staying at home, employees might not only think about work problems but, given a rewarding job environment, also about new work ideas, new career opportunities, or something else which distracts them from their family responsibilities without putting extra pressure on them. This is one possible explanation, and it is actually supported by a relatively low effect size. However, current research mainly focuses on work problems. Hence, further exploration should incorporate aspects of work engagement to make these connections clearer (see Bakker & Leiter, 2010). Further, rewards in this study go along with job security. Kinnunen and Mauno (1998) showed that job insecurity is a predictor of WFC in Finland, and within the women of their sample it decreased FWC but increased WFC. Therefore, research on the influence of rewards on dependent variables such as WFC as well as job satisfaction should include a gender perspective (cf. Mottazl, 1986; Ross & Mirowsky, 1996). Thus, this relationship is still unclear and needs further research to be better understood.

The results of the *Hypothesis 4* confirmed that if someone experiences high ERI and simultaneously high OC, he/she has the worst irritation, internal and external WFC scores. Type 2, characterized by low imbalance and high OC, is also disadvantageous regarding its dependent variables when compared with type 1 and type 3 (see Figure 7). Thus, again OC has a predominant influence. This result is in line with a study by Vrijkotte et al. (1999) that examined these types in relation to metabolic and hemostatic risk factors. They used different indicators from blood samples and found that neither the imbalance itself nor the types had a significant influence on different risk indicators of coronary heart disease. Only OC itself had a significant influence on the fibrinolytic system, whose activity is analyzed in the prophylaxis of heart attacks (Vrijkotte et al., 1999). In the high OC categories, more than four times as many employees also experience high, in contrast to low, imbalance. This relation is in line with previous assumptions (see Willis et al., 2008). The best combination in the present study seems to be represented by type 1, i.e. when someone has a good effort-reward balance and low OC. Thus, a practical implication is to try to prevent ERI and teach people how to regenerate and to avoid OC. One limitation to discuss is the choice of the cut-off values. There are teacher-specific cut-off values that correlate with the International Classification of Mental and Behavioral Disorders-10 (ICD-10; Lehr et al., 2010). Because there is only a limited number of teachers in the sample of the presented study, it was decided to use the classic values (van Vegchel et al., 2005). For future research, focusing on accurate type classification, it would be helpful to have ICD-10 validated cut-off values of a heterogeneous sample. These combination types are rarely investigated, but these results show that this is a useful approach for gaining practical applications.

#### **Further limitations and directions for future research**

Taking the complete study into account, it can be concluded that it is worth including work-family variables in general models of mental health in work psychology. To expand the present study, future research should also make allowance for different additional variables: internal and external family-to-work conflict would be interesting variables to complete the conflict aspect. Because family-to-work conflict is more strongly influenced by family than by work variables (Greenhaus et al., 2006), future research should additionally be expanded by the aspect of social effort-reward

balance, in view of the fact that even in social relations of non-work domains, an imbalance between efforts and rewards can occur (see Sperlich et al., 2009). This social imbalance may increase FWC. Furthermore, the direct and indirect effects of positive work-family interaction should be integrated in order to investigate potential buffering effects (see Wiese et al., 2010). Moreover, moderators such as gender, and resources (cf. Greenhaus et al., 2006) such as health-related self-efficacy (see Wieland, 2010; Wieland & Hammes, 2010), or work sense of coherence (see Baltes et al., 2011; Eberz, Becker, & Antoni, 2011) and leadership behavior (see Krisor et al., 2011; Rowold & Heinitz, 2008) would be worth examining. Finally, positive (e.g., work engagement) and objective health indicators (e.g., cortisol as biomarker of stress, see Hurwitz Eller, Netterstrøm, & Hansen, 2006; Lundberg, 2011; Maina, Bovenzi, Palmas, & Filon, 2009; Steptoe, Siegrist, Kirschbaum, & Marmot, 2004) should be included to develop a full model.

Another limitation is the cross-sectional design of the study, which weakens the causal interpretation of the results. Recent literature has called for more longitudinal research in the work-family domain (Greenhaus et al., 2006). For example, Innstrand, Langballe, Espnes, Falkum, and Aasland (2008) showed in their longitudinal study that there are reciprocal effects between positive and negative work-family interaction and burnout. Thus, the relation described in the present study should also be investigated in a longitudinal design to test reciprocal effects and to achieve better causal interpretations.

### **Implications for practice**

The aim of this study was to learn from the combination of mental health and work-family disciplines for science and to derive practical implications from it. However, the present study shows that, in practice, commitment to the workplace can be too strong and in this has unwished-for effects on work-family integration and mental health. Thus, at the end of a work day it is important to let employees go and fulfill other life roles in order to recover, and to come back every next day. Further, the impact of internal WFC on mental health leads to the practical implication that it is important to set life-domain priorities (over different phases of life) and life goals for oneself and to then organize everyday life, which may help to deal with OC tendencies. This study showed that, depending on the WFC type, this could have positive as well as

negative consequences. Hence, in relation to the ERI components as predictors of WFC, one practical implication is to sensitively observe what kind of effects rewards have on potential conflict experiences of followers. Another implication is to try to influence the OC behavior and high-commitment work environments (see Berg, Kallenberg, & Appelbaum, 2003). Apart from the personality aspect, there are working conditions (e.g., leadership behavior, work demands on holiday, and so on) which foster OC. Finally, in consequence of the study results it seems to be necessary to integrate work-family activities with mental health engagement in work (and scientific) practice.

## **4. Study II: Personal and Organizational Resources of Family Caregivers' Mental Health: Confirmation of a Comprehensive Work-Family Mediator Model**

### **4.1 Introduction**

Today, there is an increasing number of people who face the challenge of balancing work and caregiving roles (Zacher et al., 2012). In Germany, 2.34 million people are in need of care according to the German care insurance legislation. More than two thirds (69 %) of them were provided with care at home. It is mostly relatives who take much of the responsibility for caregiving (German Federal Statistical Office, 2011). The increasing number of care-recipients is caused by demographic changes, such as extended life expectancies, low birth rates, mobility, small family sizes, the increased number of working women and many more (cf. Barling, MacEwen, Kelloway, & Higginbottom, 1994; Barrah, Shultz, Baltes, & Stolz, 2004; Lee, Walker, & Shoup, 2001; Neal, Chapman, Ingersoll-Dayton, & Emlen, 1993; Pearlin, Mullan, Semple, & Skaff, 1990; Zacher et al., 2012). In a review, Gorey et al. (1992) found that, on average, 21 % of the employees of different organizations care for older relatives. Asking HR professionals about managing elder-care challenges in organizations, the Society for Human Resource Management found that: "The biggest challenge, however, is cost. Nearly 40 percent said elder care benefits are too costly for their organization, and one-third said there would not be enough employees utilizing elder care benefits to justify changing current benefits packages" (Society for Human Resource Management, 2003). But is this really true?

Most work-family literature focuses on employees who care for children (Buffardi, Smith, O'Brien, & Erdwins, 1999; Kossek & Ozeki, 1999; McDonald, Burton, & Chang, 2007). Therefore, human resources researchers and practitioners devote little attention to the accuracy of existing work-family research results with regard to employees who care for e.g. elderly parents, partners with serious diseases or impaired children. Often, employed caregivers decrease the hours they work, may feel that their work performance is affected and in some cases they even leave the workplace (Edwards, Zarit, Stephens, & Townsend, 2002; Reid, Stajduhar, & Chappell, 2010). In

this regard, mental health is particularly important, because mental health can mediate the relationship between eldercare demands and work performance (Zacher et al., 2012). For that reason, it is meaningful for organizations to identify those aspects which can have positive influence on work-family interferences as well as mental health with regard to employed caregivers. Hence, this study investigates whether, beside cost-intensive arrangements, organizational and personal resources such as work-family culture and health-related self-efficacy have a positive influence on the experiences of work-family interference and mental health of employees who are informal family caregivers.

Therefore, this study contributes to work-family research and concepts for organizational practice by the extension of the existing theory and the investigation of this model in a sample of employees with informal family care responsibilities. Additionally, this study answers several research calls about the complex job-stress process of caregivers by investigating whether interferences with work are reciprocally related to mental health (cf. Gordon, Pruchno, Wilson-Genderson, Marcinkus Murphy, & Rose, 2012; Janssen et al., 2004).

## **4.2 Theoretical Background**

### **Caregiving and work-family conflict**

In this study, a broad definition of informal and unpaid caregiving, which included all employed caregivers who care informally for disabled or frail people (e.g., partners, children or parents), was used (cf. Robison, Fortinsky, Kleppinger, Shugrue, & Porter, 2009). This is in accordance with the definition of Pearlin et al. (1990), who stated that “informal caregiving simply refers to activities and experiences involved in providing help and assistance to relatives or friends who are unable to provide for themselves” (p. 583). Additionally, caring includes two aspects: Someone can care for the well-being of another person affectively or he/she can express this intrinsic motivation of support for a close someone behaviorally through active caregiving (Pearlin et al., 1990).

The existing research on employees with children can provide the basis for research on the combination of work and informal care, because both responsibilities for relatives can result in interrole conflicts (Barling et al., 1994). Despite that, there are

important differences between caring for a healthy child and caring for elderly parents. For example, informal care responsibilities normally occur unexpectedly and people are confronted with negative topics like serious diseases, impairments or imminent death (Shonsey, 1994). Unpredicted events and crises lead to reduced freedom of choice in managing the new situation (Lee et al., 2001) and result in a lack of personal free time (Scharlach, 1994; Stephens, Townsend, Martire, & Druley, 2001). Furthermore, the caregiving life cycles are reversed: Whereas children become more independent with time, elders often become more dependent with time (Kossek, Colquitt, & Noe, 2001). Additionally, “a reversal of lifelong patterns of responsibility and autonomy” (Kossek et al., 2001, p. 31) occurs if children have to care for their parents. This inversion can have a negative impact on the well-being of the caregiver. Finally, informal caregivers often do not feel competent to manage all challenges arising with the care-recipient and all formal requirements, and they are often confronted with high financial costs (George & Gwyther, 1986; Kossek et al., 2001; Pearlin et al., 1990). In consequence of these differences, caregivers with informal care responsibilities are more likely to experience poorer well-being and health (Amirkhanyan & Wolf, 2006; George & Gwyther, 1986; Ho et al., 2009; Kossek et al., 2001; Pinquart & Sörensen, 2003; Stephens et al., 2001). For example, previous research has shown that caregiving is related to increased symptoms of depression, which in turn leads to lower care quality and potentially increases harmful behavior toward the care recipient (Smith, Williamson, Miller, & Schulz, 2011). Therefore, it is important that work-family researchers clarify potential similarities and differences between child and other types of family care in case of the explanation of relations between antecedents and consequences of work-family interference (cf. Kossek et al., 2001). Existing research has predominantly focused on work interference with childcare and therefore neglected the question whether existing work-family research also makes reliable predictions of the job-stress process in a broader caregiving context.

Work-family interference is “a form of interrole conflict in which the role pressures from the work and family domains are mutually incompatible in some respect. That is, participation in the work (family) role is made more difficult by virtue of participation in the family (work) role” (Greenhaus & Beutell, 1985, p. 77). This definition also suggests that conflicts can occur bidirectionally: from work to family and

from family to work. With regard to the work-family interplay, positive effects of multiple roles are also possible (Frone, 2003; Greenhaus & Allen, 2011; Poelmans et al., 2008; Sieber, 1974). But with regard to mental health, WFC often has the strongest negative impact (Amstad et al., 2011) and therefore, this study concentrates on this aspect of the work-family interplay. Hence, WFC is considered more precisely: According to Carlson and Frone (2003), WFC can be generated internally or externally. Thus, external WFC is a behavioral interference which is caused by external demands (Carlson & Frone, 2003). For example, time demands of the work and family role can be incompatible if one has a very important meeting at work late in the evening and at the same time has to be at home to care for his elderly parent. Internal WFC is a psychological interference caused by internal demands (Carlson & Frone, 2003). To take an example: If someone has to care for a disabled relative but cannot stop thinking about an important work task. This more precise consideration is in accordance with Eby et al. (2005), who called for more research regarding different forms of WFC. The differentiation between internal and external WFC is important for a more nuanced analysis and better understanding (Gordon & Rouse, 2011). Such role conflicts are especially likely to occur with sandwiched employees, who have many roles such as partner, parent, employee, caregiver and maybe more. Moreover, the differentiation between internal and external WFC seems to be important, because, as mentioned above, caregiving includes affective as well as behavioral aspects (Pearlin et al., 1990).

### **Relationship between work-family conflict and irritation**

Theoretically, according to the COR theory “people strive to retain, protect, and build resources and that what is threatening to them is the potential or actual loss of these valued resources” (Hobfoll, 1989, p. 513). Some important secondary resources are work, family and time (Westman et al., 2005). Following Westman et al. (2005), WFC “poses extreme conditions of threat and loss as the conflicting domains are interdependent; loss of resources in one domain may exacerbate further loss in the other” (p. 185). Thus, according to the COR theory, WFC causes stress, because, through the difficulties of integrating work and family demands, resources are lost (Grandey & Cropanzano, 1999). Similarly, but with regard to family caregiving, in the stress process concept by Pearlin et al. (1990), the job-caregiving conflict is defined as a secondary stressor, which has impact on health outcomes. Elder caregiving is related to



negative topics and emotions; therefore, it is assumed that these interrole conflicts are especially stressful and can impair employed caregivers' health status (Barling et al., 1994; Lawton, Moss, Kleban, Glicksman, & Rovine, 1991). This is particularly the case when one considers that caregiving produces stress both through a major life event as well as through daily hassles (Lawton et al., 1991).

One important indicator of strain in work contexts is irritation, which “can be seen as a state of mental impairment resulting from a perceived goal-discrepancy” (Mohr et al., 2006, p. 198). According to this concept, two reactions to goal-discrepancy are included: cognitive and emotional irritation (Mohr et al., 2005a; Mohr et al., 2006; Mohr et al., 2005b, Mohr, Rigotti, & Müller, 2007, Müller et al., 2004). Ruminations are the main characteristic of cognitive irritation. Thus, people think about their goal-challenge again and again because they want to reduce goal-discrepancy, but often these ruminations result in negative emotions, cognitive inflexibility, paralysis of action and even depressions (Mohr et al., 2005a; Mohr et al., 2006; Mohr et al., 2005b, Mohr et al., 2007, Müller et al., 2004). Irritability is the main characteristic of emotional irritation. Thus, after repeated efforts toward goal-achievement, people become irritated and tend to react in an aggressive manner against others, which is also related to depression. Hence, irritation is located between actual and chronic stress experiences and can be seen as a screening indicator of more severe mental impairments (Mohr et al., 2005a; Mohr et al., 2006; Mohr et al., 2005b, Mohr et al., 2007, Müller et al., 2004).

When people face the challenge of integrating work and family demands, they have to prioritize some goals over others, and some goals may not be reachable at all. This is particularly the case for informal family caregivers who have to subordinate or dismiss some of their personal goals if they decide to invest more resources in their caregiving role. Frequently, they have to give up some of their own goals, which, in turn, is often a chronic stressor (Wrosch, Amir, & Miller, 2011). Both aspects of WFC, external as well as internal WFC, lead to the experience of difficulties in fulfilling all demands and the threatening of resources and goals. This resource loss on the one hand and the personal goal-discrepancy on the other hand explain theoretically why WFC should increase irritation.

There are numerous studies that verify the negative impact of WFC on different mental health indicators (cf. Allen et al., 2000; Frone, 2000; Grant-Vallone &

Donaldson, 2001; Greenhaus et al., 2006; Hammer, Saksvik, Nytro, Torvatn, & Bayazit, 2004; Kossek & Ozeki, 1999; Mullen et al., 2008). For example, Amstad et al. (2011) found in their meta-analysis weighted mean correlations of  $r = .49$  for the relationship between WFC and work-related stress, and  $r = .35$  and  $r = .54$  for domain-unspecific health outcomes such as psychological strain and stress, respectively. With regard to family caregivers, Barling et al. (1994) found that elder care involvement, thus the extent of physical and psychological assistance for elderly parents as well as the attitudes towards parents, were positively related to interrole conflict ( $\beta = .28, p < .01$ ) in a sample of university staff. Additionally, the study of Barling et al. (1994) showed that eldercare interrole conflict was positively associated with cognitive difficulties, which were an indicator of psychological strain ( $\beta = .53, p < .01$ ). Stephens et al. (2001) found that the interrole conflict between parent care and another role was positively associated with depressive symptoms in females ( $\beta = .22, p < .01$ ).

To the author's knowledge, it is only Gordon and Rouse (2011) who distinguished between internal and external work-caregiving conflict in their study. Using a female full-time working and caregiving sample, they found that external work-caregiving conflict was related to work costs like job interruptions more strongly than internal work-caregiving conflict, but they investigated no mental health indicator in their study. To date, four studies have shown that WFC is positively related to irritation (Höge, 2009; Jacobshagen, Amstad, Semmer, & Kuster, 2005; Mohr et al., 2007, Müller et al., 2004) but none of them has differentiated between internal and external WFC. Therefore, based on COR theory and previous research results, it is assumed that external and internal WFCs are results of restricted resources, making it hard to reach all goals of different roles and leading to higher irritation, hence:

*Hypothesis 1: External (H1a) and internal WFC (H1b) are positively related to irritation.*

### **Work-family culture in relation to irritation**

Informal caregiving is often associated with negative outcomes, which is expressed by the term "caregiving burden" (George & Gwyther, 1986, p. 253). Despite the fact that combining work and caregiving roles is related to strain, positive experiences, such as the reassurance that the carereceiver is getting good care, the

feeling of being able to pay something back to the care-receiver and an improved self-efficacy, can also result from these multiple roles (Scharlach, 1994). Thus, having various work and caregiving roles at the same time may also be potentially beneficial (cf. Edwards et al., 2002; Neal et al., 1993; Reid et al., 2010; Scharlach, 1994). Moreover, there are also positive antecedents of the work context, which are assumed to reduce role conflicts and strain. This argumentation is confirmed by the results of the study conducted by Robinson et al. (2009), which found that working caregivers had better self-reported health than non-working caregivers. Therefore, even though work interferes with caring demands, it is also an important resource for the caregiver (Robinson et al., 2009) and hence, it is important to identify further resources which potentially reduce this interference and improve mental health. Thus, in line with the COR theory about resource gain, “resources would be expected to mitigate the impact of caregiving demand“ (Lawton et al., 1991, p. 181) and should reduce strain.

One important organizational resource in the work-family domain is a family-friendly culture. Work-family culture is defined as “the shared assumptions, beliefs and values regarding the extent to which an organization supports and values the integration of employees’ work and family lives” (Thompson, Beauvais, & Lyness, 1999, p. 394). Three aspects characterize the organizational work-family culture: (1) managerial support, (2) no negative career consequences and (3) family-friendly time demands (Thompson et al., 1999; Wiese, 2004). The first aspect means social support by supervisors for family-related concerns. The second aspect means that if employees use family-friendly arrangements offered by their employer, they do not have to fear possible negative career consequences. And the third aspect means that the shared norms about the adequate working-times are family-friendly and that the career is not defined by who sits in his bureau longest. In this conceptualization of work-family culture, *hindrance* (high working time expectations and potential negative career consequences) as well as *support* (family-friendly management) aspects are considered beyond the mere use of family-friendly arrangements (cf. Dijkers, Geurts, den Dulk, Peper, & Kompier, 2004; Dijkers et al., 2007a; Peeters et al., 2009).

According to the COR theory, work-family culture can be seen as a resource, such as understanding and support of the supervisor and co-workers (cf. Hobfoll, 2001), which should result in lower stress. With regard to irritation, work-family culture should

facilitate the integration of work and family role demands and therefore, improve goal-discrepancy. Based on the perceived organizational support (POS) theory, employees have a general view about how far an organization is supportive, because it treats its employees' contributions to the organization as valuable and takes steps to enhance employees' well-being (Eisenberger & Stinglhamber, 2011). This leads to a positive reciprocal relationship in which employees are committed and want to repay for this sympathetic treatment (Eisenberger & Stinglhamber, 2011). Here, work-family culture can be seen as one aspect of the global attribution of perceived organizational support (Thompson, Jahn, Kopelman, & Prottas, 2004), which is particularly important because it can have far-reaching consequences for private life. According to the theory of Eisenberger and Stinglhamber (2011), POS reduces stress, because employees anticipate that the organization will act helpfully if they need it. Additionally, positive treatment by the organization will be experienced as rewarding and will improve positive emotions and self-efficacy, which, in turn, leads to better mental health. In their review, Rhoades and Eisenberger (2002) found a negative relationship between POS and strains ( $r = -.28, p = .00$ ). Janssen et al. (2004) found that social workplace support was negatively related to emotional exhaustion in predominantly female Dutch and US samples. Thus, some more studies found support for the positive influence of work-family culture on stress and well-being (cf. Mauno et al., 2005; Thomas & Ganster, 1995; Thompson & Prottas, 2005). Moreover, Behson (2005) showed that two aspects of work-family culture, namely manager support and career impact, made an even higher relative contribution to stress than existing formal, organizational work-family support. However, none of the studies described above focused on employees with informal care responsibilities.

In relation to informal family care, research has shown that informal family caregivers take fewer vacations and sometimes use their vacations for caregiving tasks instead of regeneration activities (Wagner & Neal, 1994). Buffardi et al. (1999) found that employees with elder care responsibilities had slightly lower perceived organizational support and lower WFB. Regarding employed caregivers, Reid et al. (2010) found that social support was positively related to well-being ( $\beta = .28, p < .01$ ). In contrast, Zacher and Winter (2011) found a negative but not significant relationship between the more specific concepts of perceived organizational eldercare support and

eldercare strain. To the author's knowledge, the relationship between work-family culture and irritation has not yet been investigated, and not at all in a family caregiver sample. Hence, in congruence with theory and the predominant research findings, it is supposed that:

*Hypothesis 2a (H2a): Work-family culture is negatively and directly related to irritation.*

### **Health-related self-efficacy in relation to irritation**

It is not only organizations that are responsible for a successful integration of work and caregiving roles. The people's own resources are also important for the extent to which they experience WFC and irritation. Pearlin et al. (1990) assumed that "virtually everything we are interested in learning about caregiving and its consequences is potentially influenced by key characteristics of the caregiver" (p. 585). Pearlin et al. (1990) mentioned aspects such as age, ethnicity or gender. In order to enlarge existing literature in Study II, personal resources which are important in stress processes were focused on.

With regard to the stressor-strain relationship, one important resource is self-efficacy (Jex, Bliese, Buzzell, & Primeau, 2001), which is a core characteristic of social-cognitive theory (Bandura, 1977). Self-efficacy is a general opinion of oneself that one has the ability to successfully behave in a requested way, and the "strength of people's conviction in their own effectiveness is likely to affect whether they will even try to cope with given situations" (Bandura, 1977, p. 193). Thus, people high in self-efficacy experience lower stress (Heuven, Bakker, Schaufeli, & Huisman, 2006) and persist longer and with more effort in goal attainment activities (Bandura, 1977; Schwarzer & Hallum, 2008). It is therefore assumed that higher self-efficacy results in lower experiences of irritation. Besides the general concept of self-efficacy, different specific concepts of self-efficacy have been developed (cf. Heuven et al., 2006; Müller et al., 2004; Schwarzer & Hallum, 2008). Because irritation is an indicator of mental health, a health-specific conceptualization of self-efficacy was focused in this study.

Health-related self-efficacy is defined as the degree to which people believe that they can handle health and disease challenges actively and effectively with the aim of staying healthy (Wieland & Hammes, 2008). Thus, if people believe that they have the

competence to effectively interact with health challenges and have better expectations regarding goal attainment, they are expected to experience lower irritation. To date, no study has been published which analyzes the relation between health-related self-efficacy and irritation. But previous studies found that general as well as occupational self-efficacy were negatively related to irritation (Mohr et al., 2006; Müller et al., 2004). Based on the COR theory and the self-efficacy theory, it is assumed that health-related self-efficacy acts as a resource which leads to lower irritation:

*Hypothesis 2b (H2b): Health-related self-efficacy is negatively and directly related to irritation.*

### **Work-family culture in relation with work-family conflict**

According to the theory, POS improves work-family balance by the enhancement of self-efficacy, but this is more likely to be the case with one more specific aspect of POS, namely the family-friendly orientation, thus work-family culture (Eisenberger & Stinglhamber, 2011). In line with theory, the dominance analysis by Behson (2002) and the meta-analytic results of Kossek et al. (2011) showed that WFC was better predicted by work-family culture than by general aspects of perceived organizational support. As indicated by COR theory, work-family culture as a resource in the sense of social support can have a beneficial influence against upcoming WFC, because “in COR terms, decreasing demands/losses and increasing resources/gains in one domain may leave more resources available for the other domain, thus reducing conflict prospects” (Westman et al., 2005, p. 188).

Corresponding to theory there is good and consistent empirical evidence that work-family culture is negatively related to WFC in standard samples (Allen, 2001; Dikkers et al., 2007a; Kinnunen et al., 2005; Kossek et al., 2011; Krisor et al., 2011; Mauno et al., 2005; Thompson & Prottas, 2005; Thompson et al., 1999; Wiese, 2004). Thus, the meta-analytic review conducted by Michel et al. (2011) found a corrected correlation of this relationship of  $\rho = -.11$ . Additionally, Behson (2005) found in his study that two aspects of work-family culture had an even higher relative contribution to WFC than existing formal support. Thus, work-family culture seems to be an important resource in reducing WFC in general.

In relation to caregiver samples, Janssen et al. (2004) found that social workplace support was negatively related to negative work-home interference in a predominantly female Dutch sample, but not in the US sample. More specific to the research question of this study, Gordon et al. (2012) found that the emotional workplace support of supervisors and coworkers was significantly negatively related to work interference with caregiving ( $\beta = -.42$ ) in an older female caregiver sample. Additionally, Barrah et al. (2004) found that supervisors' family-supportive behavior ( $\beta = -.25, p < .05$ ) and a family-friendly workplace culture ( $\beta = -.16, p < .05$ ) were related to lower levels of work interference with family. Based on aforementioned theory and existing research, the following hypothesis is proposed:

*Hypothesis 3: Work-family culture is negatively and directly related to external (H3a) and internal WFC (H3b).*

### **The relation between health-related self-efficacy and WFC**

In addition to organizational resources, personal resources are also important predictors of WFC. According to COR theory, personal resources define how stressful different challenges are experienced (Hobfoll, 1989). According to the resource caravan assumption of COR, people with several major resources often also have other resources, e.g. someone high in self-efficacy often is highly optimistic as well (Hobfoll, 2001). Hence, it can be assumed that if people, in the sense of health-related self-efficacy, feel able and competent to manage their own health status, they are more relaxed when experiencing that work time demands interfere with family time demands (external WFC) as well as when they have to think about work problems at home (internal WFC). This relationship has not yet been investigated in general nor in a sample of family caregivers.

In line with the theoretical assumptions, the meta-analysis conducted by Allen et al. (2012) found that the uncorrected mean sample weighted correlations of seven independent samples including 1947 participants was  $r = -.24$  for the relation between self-efficacy and WFC. This result was in accordance with the findings of the review by Zhang and Liu (2011). Therefore, it is assumed that this interplay is similar with regard to the more specific concepts, thus:

*Hypothesis 4: Health-related self-efficacy is negatively and directly related to external (H4a) and internal WFC (H4b).*

### **Reciprocal relationship between WFC and irritation**

Up to this point, it was assumed that both types of WFC have impact on irritation. That is the common conjecture about the direction of the relationship between WFC and mental health indicators in work-family research (cf. Frone & Russell, 1997; Grant-Vallone & Donaldson, 2001; Kelloway, Gottlieb, & Barham, 1999; Schneewind, Reeb, & Kupsch, 2010). But in line with the corollary 2 of COR theory it is also possible that “those who lack resources are not only more vulnerable to resource loss, but that initial loss begets future loss” (Westman et al., 2005, p. 169). Thus, if people are already irritated, they have lower cognitive and emotional resources. This can result in stronger experiences that behaviorally, demands of work and family are incompatible (external WFC) and that psychologically, they have to think more about work-related topics at home (internal WFC), because they have not had enough capabilities during working time. Therefore, in terms of COR theory, a loss spiral starts. It is important to recognize that these reciprocal effects can occur immediately – without any time delay – for example, through processes of seeking emotionally-consistent information or attributions of negative emotions on WFCs (cf. Kelloway et al., 1999).

Hence, in accordance with the first hypothesis, Höge (2009) found that cognitive and emotional irritation had positive impact on WFC in a cross-sectional study with female participants. With regard to longitudinal studies, Kelloway et al. (1999) found that stress predicted strain-based WFC six months later in a sample in which half of the participants had eldercare responsibilities. Demerouti et al. (2004) found that work-home interference and exhaustion had lagged short-term (six weeks) as well as long-term (three month) effects on each other. Similar results were found by the study of Innstrand et al. (2008), who showed that WFC predicted burnout two years later and that also burnout predicted WFC two years later.

With regard to family caregivers’ challenges, Stephens (2001) concluded that “it appears that the influence among parent care stress, interrole conflict, and well-being are likely complex and reciprocal” (p. 33). Several other work-family and work-caregiving researchers called for future research that considers reciprocal relationships



between WFC and outcome variables such as mental health (Gordon et al., 2012; Janssen et al., 2004). Therefore, it is hypothesized that:

*Hypothesis 5: There are reciprocal relationships between external and internal WFC and irritation: While WFC increases irritation, irritation also increases WFC (H5).*

All hypotheses are depicted in Figure 8.

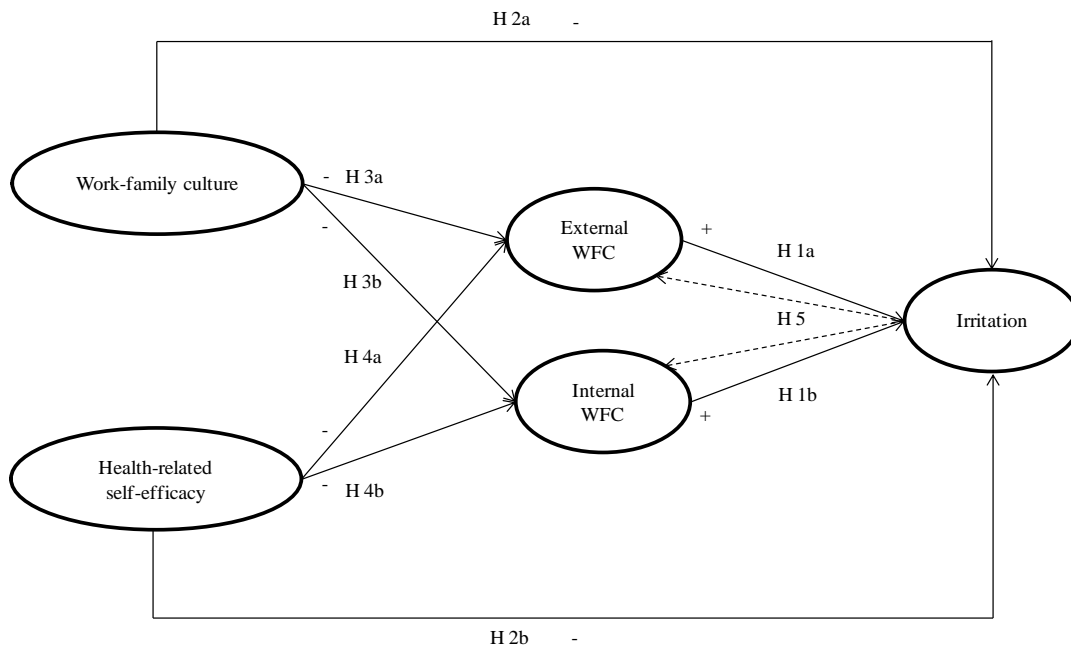


Figure 8. Hypothesized model of Study II.

### 4.3 Method

#### Study design

The study was conducted within an employee survey in an organization of the information and communications sector in Germany. The aim of this cross-sectional examination was to investigate the compatibility of work roles and elder care demands in this company. More precisely, it was aimed at identifying how many employees have informal family care responsibilities and what organizational support they need. This engagement was agreed on with the human resources department, management and the workers' council. Further, the survey was communicated to all employees via intranet

and the company magazine, and every employee was invited to take part in the survey and reminded twice via e-mail.

### **Sample**

Among all employees, the response rate was 48 %. Of these respondents, 14 % had informal family care responsibilities. More precisely, 2 % cared for dependents in their own home and 12 % cared for dependents who lived outside the participants' home. After the elimination of missing data cases, a final sample of N = 508 employed people with family care responsibilities remained. Participants in this sample were 41 % female and 59 % male. Nearly half of the employees (49 %) were between 41 and 50 years old (3 %: 21-30 years, 28 %: 31-40 years, 19 %: 51-60 years). Most of them worked full-time (81 %), which was defined as above at least 35 working hours per week. A smaller number had leadership responsibilities (11 %). Additionally, most of the participants (80 %) lived in a (married) partnership. Half of the partners (54 %) also worked full-time. Of the final sample, 15 % cared for dependents in their own household and 23 % were the main caring person with the most responsibilities for the care-receiver. The majority cared for their own parents (63 %), parents-in-law (14 %) or grandparents (12 %). The minority cared for dependent children (3 %), siblings (2 %), spouses or partners (4 %), or other relatives (3 %). Of these cared-for people, 35 % were not (yet) classified in care levels. Of the others, 24 % had care level 1, 26 % care level 2 and 16 % care level 3. Additionally to the dependent care responsibilities, 61 % of the employees had children.

### **Measures**

**Work-family conflict.** WFC was measured with a German version (see Seiger & Wiese, 2009) of the twelve-item scale developed by Carlson and Frone (2003). External and internal WFC were measured using three items in each case. A sample item for internal WFC is "When you are at home, how often do you try to arrange, schedule or perform job-related activities outside of your normal work hours?" One exemplary item for external WFC is "How often does your job or career interfere with your home life?" Answers were assessed on a five-point Likert-scale ranging from "Never" (1) to "Always" (5). All scales were reliable with Cronbach's alpha .84 for external WFC and .87 for internal WFC.

**Irritation.** Irritation was measured with eight items from the scale developed by Mohr, Rigotti, and Müller (2005b). Three items assessed cognitive irritation. A sample item is “I find it difficult to unwind after work.” Five items measured emotional irritation. One of these items was “When I come home from work tired, I’m quite nervous.” The measures were assessed on a seven-point Likert-scale ranging from “Does not apply at all” (1) to “Does definitely apply” (7). Reliability of the scale was good with Cronbach’s alpha .92.

**Work-family culture.** Work-family culture was measured with a German version (see Wiese, 2004) of the scale developed by Thompson et al. (1999). Of the original 20 items, only items with factor loadings above .60 were used in this study. Therefore, 14 items of the original scale were used. This scale includes three subscales: managerial support, career consequences and organizational time demands. Further, if original items explicitly mentioned the care for children, these items were modified in relation to care for dependent relatives. Managerial support was measured with six items such as “Higher management in this organization encourages supervisors to be sensitive to employees’ family and personal concerns.” Career consequences were assessed with four items such as “Many employees are resentful when women in this organization take extended leaves to care for dependent relatives”. Organizational time demands were measured with four items. A sample item is “To get ahead at this organization, employees are expected to work more than 50 hours a week, whether at the workplace or at home.” Answers were given on a five-point Likert-scale ranging from “I strongly disagree” (1) to “I strongly agree” (5). With exception of the six items measuring managerial support, all items were recoded so that higher scores indicate a family-friendly organizational culture. Reliability of the total scale was good with Cronbach’s alpha .88.

**Health-related self-efficacy.** Individuals’ health-related self-efficacy was assessed using the scale used by Wieland and Hammes (2010). The scale consists of ten items. A sample item is “When I’m confronted with health problems, I mostly have several ideas on how to handle them.” Items were assessed on a five-point Likert-scale ranging from “I strongly disagree” (1) to “I strongly agree” (5). Cronbach’s alpha of this scale was good with .89.

### **Analytical strategy**

To assess the hypotheses, analyses were calculated by using IBM SPSS Statistics 20.0 and Amos 20.0 for structural equation modeling. All latent variables were indicated by three indicators (items or parcels; cf. Bandalos, 2002). Covariances between the independent variables (work-family culture and health-related self-efficacy) as well as between the error terms of the interdependent variables (external and internal WFC) were assumed (cf. Landis, Edwards, & Cortina, 2009). With exception of one irritation parcel (kurtosis = -1.11), all other skew and kurtosis values were under 1. Therefore, univariate normality was given (see Temme & Hildebrandt, 2009). Nevertheless, the multivariate critical ratio was above 2.57 and therefore, multivariate normality was not given. Even if the normality assumption is violated, the ML estimates have proved to be robust (Hoyle, 1995). To ensure the stability of results, the bootstrapping method was used additionally (see Byrne, 2004; Enders, 2001; West et al., 1995). Therefore, test statistic p values and parameter standard errors were analyzed with ML bootstrap resampling and a 90 % confidence level (see Nevitt & Hancock, 2001). The model fit was indicated by the following fit indices: The SRMR below .08 (Hu & Bentler, 1999), the GFI, AGFI, CFI, and also the NFI above .90 indicate good model fit (see Byrne, 2001; Hu & Bentler, 1998). Additionally, the RMSEA lower than .08 indicates a reasonable model fit (Browne & Cudeck, 1993).

Regarding the relationship between WFC and irritation, there is no defined time-lag, which is needed to verify that conflicts have impact on irritation and otherwise. Therefore, it is assumed that simultaneous effects are possible as well. Reciprocal relationships between WFCs and irritation were tested according to the procedure described by Wong and Law (1999). This procedure was frequently used in work-family research (cf. Frone et al., 1992; Rothbard, 2001; Rothbard & Edwards, 2003). With cross-sectional data, this method is appropriate if simultaneous effects concerning the content of the relationship are more realistic than time-lagged reciprocal effects (Wong & Law, 1999). To investigate these reciprocal relationships, each conflict variable was taken into account separately. Regarding a nonrecursive SEM, for an identified model, it is necessary that some exogenous, instrumental variables are directed to the two potentially interrelated endogenous variables (Berry, 1984; Wong & Law, 1999). These instrumental variables should be an antecedent of only one of the

endogenous variables on the basis of theory (Berry, 1984; Wong & Law, 1999). Hence, the original model of this study was used with work-family culture as instrumental variable for WFC and health-related self-efficacy as instrumental variable for irritation. Thus, the exclusion of the path from work-family culture to irritation and also the path from health-related self-efficacy to the particular WFC was necessary. This is in accordance with general assumptions about the stress process, in which psychological resources have stronger protecting value against stressors if they are conceptually tightly matched to the specific characteristics of that stressor (cf. de Jonge & Dormann, 2006; Zacher et al., 2012). Another important precondition for testing reciprocal effects is that the error terms of the endogenous variables are correlated (Berry, 1984; Wong & Law, 1999). In sum, five SEM models were analyzed: Model 1 is the basic model which depicts H1-H4 and in dashed lines H5 (see Figure 8). To investigate H5, a nonrecursive model (model 2) with a reciprocal relationship between external WFC and irritation was tested against a recursive model (model 3) with the influence of external WFC on irritation. Moreover, a nonrecursive model (model 4) which included reciprocal effects between internal WFC and irritation was tested against a recursive model (5) with the influence of internal WFC on irritation.

Because all data were gathered from single sources, it should be tested for common method bias (Podsakoff et al., 2003; Podsakoff & Organ, 1986). For this reason, Harman's one-factor test was conducted to control for this bias. Results of the unrotated factor analysis showed that there were several factors with an eigenvalue above 1.0 each. Hence, there is no general factor indicating common method bias.

#### **4.4 Results**

In Table 2 means, standard deviations, reliabilities and bivariate correlations are presented. In addition to the mean score, which was calculated for all other variables, in case of irritation the sum score was used. Therefore, the sum score can be compared to norm values. The sample of this study had a mean sum score of 27.56 ( $SD = 12.21$ ). This is equivalent to an average percentile ranking of 65, thus above the average (cf. Mohr et al., 2005a). All correlations were in line with the hypotheses.

Table 2

*Means, Standard Deviations, Internal Consistencies and Correlations of the Study Variables of Study II*

	M	SD	1	2	3	4	5
1 Work-family culture	3.07	0.79	(.88)				
2 Health-related self-efficacy	3.35	0.75	.18**	(.89)			
3 External WFC	2.97	0.93	-.45**	-.28**	(.84)		
4 Internal WFC	3.05	1.04	-.34**	-.19**	.45**	(.87)	
5 Irritation	3.48	1.52	-.36**	-.43**	.46**	.57**	(.92)

*Note.*  $N = 508$ . \*\*  $< .01$  two-tailed.

Regarding measurement model evaluation, all indicator loadings of the measurement model of the basic model (model 1) were above .70. The structural model fit was good: SRMR = .05, GFI = .94, AGFI = .91, CFI = .96, NFI = .95, and RMSEA = .06. Results of Hypotheses 1-3 are shown in Table 3. External ( $\beta = .14$ ,  $p < .01$ ) and internal WFC ( $\beta = .44$ ,  $p < .01$ ) were positively related to irritation. In contrast, work-family culture ( $\beta = -.12$ ,  $p < .05$ ) and health-related self-efficacy ( $\beta = -.30$ ,  $p < .05$ ) were negatively related to WFC. Work-family culture was also negatively related to external ( $\beta = -.48$ ,  $p < .01$ ) and internal WFC ( $\beta = -.44$ ,  $p < .01$ ). Health-related self-efficacy was negatively related to external ( $\beta = -.25$ ,  $p < .01$ ) and internal WFC ( $\beta = -.17$ ,  $p < .01$ ), too. Therefore, Hypotheses 1-4 were supported. Standardized indirect effects for the influence of work-family culture and health-related self-efficacy on irritation through WFC as a mediator were  $-.26$  ( $p < .01$ ) and  $-.11$  ( $p < .01$ ), respectively. Squared multiple correlation for irritation was  $.55$  ( $p < .01$ ), indicating that a good proportion of variance in irritation was explained by the model's variables. Squared multiple correlations for external and internal WFC were smaller with  $.32$  ( $p < .01$ ) and  $.24$  ( $p < .01$ ), respectively.

Table 3

*Results of Hypotheses Testing (H1-H4) of Study II*

Hypotheses			Standardized path coefficients	
H 1a	External WFC	→	Irritation	.14**
H 1b	Internal WFC			.44**
H 2a	Work-family culture			-.12*
H 2b	Health-related self-efficacy			-.30**
H 3a	Work-family culture	→	External WFC	-.48**
H 3b			Internal WFC	-.44**
H 4a	Health-related self-efficacy	→	External WFC	-.25**
H 4b			Internal WFC	-.17**

*Note.* \*  $< .05$ ; \*\*  $< .01$ .

The investigation of reciprocal effects between WFCs and irritation showed the following results. Regarding external and internal WFC the fit of the models 2 and 4

with each reciprocal relationship was acceptable (SRMR = .05, CFI = .96, GFI = .94, AGFI = .91, TLI = .95, RMSEA = .06). First, the influence of external WFC on irritation remained significant ( $\beta = .49, p < .01$ ) and second, the reversed relationship of the influence of irritation on external WFC was also significantly positive ( $\beta = .60, p < .01$ ). Hence, there is a reciprocal relationship. Through the additional reciprocal relationship, the model fit improved significantly in contrast to the same model without this path (model 3;  $\Delta\chi^2 = 26.63, \Delta df = 1, p < .001$ ). Moreover, the influence of internal WFC on irritation remained significant ( $\beta = .87, p < .01$ ) and second, the reciprocal relationship was also significant but weaker ( $\beta = .42, p < .01$ ). Hence, there is a reciprocal relationship, too. In contrast to the same model without this path (model 5), through the additional reciprocal relationship, the model fit improved significantly ( $\Delta\chi^2 = 13.96, \Delta df = 1, p < .001$ ). Therefore, *Hypothesis 5* was supported. The fit indices of all models which were analyzed are displayed in Table 4. The results of *Hypothesis 5* are summarized in Table 5.



Table 4

*Summary of the Model Fit Indices of Study II*

	$\chi^2$	df	p	SRMR	GFI	AGFI	CFI	NFI	RMSEA
Model 1: Basic model	244.16	80	.00	.05	.94	.91	.96	.95	.06
Model 2: Nonrecursive model – external WFC $\diamond$ Irritation	244.16	80	.00	.05	.94	.91	.96	.95	.06
Model 3: Recursive Model – external WFC $>$ Irritation	270.79	81	.00	.06	.93	.90	.96	.94	.07
Model 4: Nonrecursive Model – internal WFC $\diamond$ Irritation	244.16	80	.00	.05	.94	.91	.96	.95	.06
Model 5: Recursive Model – internal WFC $>$ Irritation	258.12	81	.00	.06	.94	.91	.96	.94	.07

Table 5

*Reciprocal Relationships Between External and Internal WFC and Irritation (H5) of Study II*

Paths	Path coefficients	$\Delta\chi^2$ ( $\Delta df = 1$ )
External WFC → Irritation	.49***	26.63***
Irritation → External WFC	.60***	
Internal WFC → Irritation	.87***	13.96***
Irritation → Internal WFC	.42**	

Note. \* < .05; \*\* < .01; \*\*\* < .001.

## 4.5 Discussion

This study makes the following contributions to existing work-family literature: First, the basic conceptual model of WFC in the job-stress process was validated in an increasing population of employed informal family caregivers. Second, this model differentiated between internal and external WFC, which is important for a more detailed understanding. Third, the model was extended by organizational and personal resources, namely work-family culture and health-related self-efficacy. And fourth, reciprocal effects were investigated. Thus, to summarize the results of this study, it can be concluded that (1) in a family caregiver sample the WFC-mediation model fits well, (2) work-family culture is an important resource for internal and external WFC and also, but to a somewhat lesser extent, for irritation, (3) health-related self-efficacy is beneficial for internal and external WFC and even more beneficial for irritation and (4) both types of WFC and irritation are mutually dependent on each other.

### Implications for theory

First, as assumed in the theory section, the irritation sum score of the investigated caregiver sample was above the average irritation norm (cf. Mohr et al., 2005a). Therefore, this sample seems to be an important target group for health-related theory-development, research and practice. Gordon et al. (2012) called for other samples than older women and suggested that also middle-aged employed caregivers as well as men

should be included in future sample choices. In this study, the definition of who is categorized as a caregiver and was included in the sample was independent of the amount of care the employee actually provides, who the care recipient is and the impairment the person concerned has. Consequently, the caregiver definition was broader than in several other studies (cf. Gorey et al., 1992). Despite other existing definitions, this definition was chosen, because even if employed relatives do not themselves provide care in-home, they can also experience WFC. Although they perhaps make use of professional care, they may experience internal WFC as a result of thinking about their relatives while at work. Moreover, studies often exclusively investigate employed caregivers who care for elders who are cognitively impaired (Edwards et al., 2002) or for family-members who have other mental illnesses (Wrosch et al., 2011), which is a very specific sample definition. However, for basic organizational questions, this definition is neither necessary nor realistic, because it neglects other employed caregivers who e.g. care for an impaired child and maybe need different forms of organizational support than parents of non-impaired children. Additionally, by choosing the broad definition of caregivers, the problem of overrepresentation of extremely distressed caregivers was prevented (cf. Pinquart & Sörensen, 2003; Zacher et al., 2012).

Despite this broader definition, the age of the participants of this study was in line with a typical employed elder caregiver (Gorey et al., 1992; Lee et al., 2001). The review from Gorey et al. (1992) found more female and more full-time working caregivers but slightly fewer married caregivers than were in this study. However, it must be pointed out that this review is twenty years old and considered just the care for older people. Additionally, the results of this study showed that there were no differences in mean scores of irritation and internal and external WFC with regard to the type of care recipient involved. Thus, there were e.g. no differences in the degree of irritation of people who care for elders in contrast to people who care for disabled children. Finally, this sample choice includes a broader range of potentially multiple role conflicts with and without different combinations of partner, parent, child, employee and many more roles (cf. Stephens et al., 2001), which leads to a higher generalizability of results. Nevertheless, the sample cannot be assumed to be representative of all caregivers because it is restricted to one organization.

Second, there is some theoretical overlap in the definitions of irritation and WFC, which is characterized by ruminations and the inability to relax. According to the study results, the differential characteristics of these constructs became obvious with regard to dissimilar function of resources: The correlations of health-related self-efficacy and both types of WFC were distinct from the correlation between health-related self-efficacy and irritation. The correlation coefficients differed significantly. Further, structural equation modeling showed that, regarding the instrumental variables, the relationships were strongest between similar theoretical constructs, such as between work-family culture and WFC, as well as between health-related self-efficacy and irritation. Thus, work-family culture is an important resource for WFC and health-related self-efficacy is beneficial for irritation. This is in accordance with the aforementioned interplay between variables in the organizational stress research, which is highly dependent on the closeness of matching and specificity of the variables (cf. de Jonge & Dormann, 2006; Zacher et al., 2012).

Third, regarding demands which can have negative impact on irritation, results showed that the relation between internal WFC and irritation was much stronger than for external WFC. In the study conducted by Lapierre and Allen (2006) results were similar in that strain-based WFC, which is comparable with internal WFC, was more strongly related to affective well-being than time-based WFC, which is comparable with external WFC. It is therefore important for theory and research to differentiate between several types of WFC.

Fourth, the inclusion of reciprocal relationships in this model is important, because it makes interconnections even in a cross-sectional study obvious and is more realistic in the mapping of psychological processes than one-way relationships.

### **Implications for practice**

First of all, this study illustrates that aspects of work can function as resources for informal caregivers. Thus, it is relevant to mention that even if family and work demands can interfere with each other, both life domains are characterized by demands and resources. Therefore, especially in this sample, work can function as a source not only of costs but also of benefits (cf. Edwards et al., 2002; Neal et al., 1993; Reid et al., 2010; Scharlach, 1994), such as providing social support, distraction from the family

situation and experiences of success. In line with this argumentation is the aforementioned result of the study conducted by Robinson et al. (2009), which found that working caregivers had better self-reported health than non-working caregivers.

Therefore, it is important for HR practitioners to know that work-family culture can be beneficial for WFC and irritation. Thus, this result should be considered by work-life-balance as well as health experts in an organization. According to the concept of work-family culture in this study, three approaches are important: First, management and executives should know and understand that a family-friendly culture is based on the daily family-friendly behavior of supervisors (and colleagues) and that this can have influence on employees' health status. Therefore, a workshop to raise awareness of this leadership responsibility would be necessary. This workshop should include relevant information about family caregiving, its bearing on the personal situation, best practices of other companies, the connection with the aims, vision and values of the organization as well as the development of leadership guidelines and support by the HR department. Second, based on this, with regard to family-friendly working times, it is important for organizations to understand that, with a life span perspective, working times have to be flexible if employees are to be committed during or also beyond their career years. Thus, different approaches are beneficial both for the organization and the family caregiver employee, such as family illness leave, long-term flexible work schedules and daily short-term flexibility in work scheduling, with the aim of preventing coming too late to work or leaving too early as well as the intention to quit the job due to family responsibilities (Scharlach, 1994; Shoptaugh, Phelps, & Visio, 2004). Third, if such family-friendly arrangements are available and employees use them, this must not put their careers at risk. Therefore, it would be an advanced proceeding if career perceptions were discussed in dialogue with supervisors and HR experts as well as the caregiver. In addition, a career plan should be developed which also takes into consideration caregivers' family demands. This would be an effective strategy to strongly commit talents to the organization because this procedure communicates - in the sense of POS theory - that the organization attaches value to the employee holistically as a complete person, which is also beneficial for lower experiences of irritation.

Additionally, health experts in a company could implement preventive interventions such as coaching or trainings to improve health-related self-efficacy. These interventions should be based on the understanding that the responsibility for the

employee's health lies with the individual but also with employers and society. For this reason, a combination of personal, workplace and cultural prevention should be developed to improve the health-related self-efficacy (cf. Wieland & Hammes, 2008), which includes a section about family caregiver demands, resources and work-family integration strategies. Finally, individuals themselves are responsible for work-family culture and health-related self-efficacy, too. They should on the one hand communicate their own needs at work where it is appropriate and on the other hand behave as family-friendly colleagues themselves. Additionally, with regard to health-related self-efficacy, they should become active and should try to improve their health and stress levels by identifying stressors, setting priorities, dismissing overly ambitious aims and consciously learning to relax.

### **Limitations and directions for future research**

In general, future research should consider samples from more than one company to confirm the present results. This exact analysis of one organization was interesting because it is still important to know actual facts about how many people are concerned with family caregiving in a company, but it may exclude sector-specific differences such as education or age. Furthermore, the present study was limited to the German culture. Because of the fact that, in a more collective culture, family caregiving may be not seen as such a taboo topic but as a normal responsibility for the generations, it would be interesting to see if work-family culture is more developed and if linking mechanisms with irritation are the same in other cultures. This study was conducted with a cross-sectional design which does not allow causal interpretations. Therefore, present research questions should also be addressed longitudinally with different short and long-term delays. As an example, Hepburn and Barling (1996) used a daily questionnaire for several days, but it also would be interesting to examine monthly or yearly developments because, as mentioned above, family caregiving includes daily hassles and also longer-lasting strains. Thus, reciprocal effects should also be investigated in a long-term design to extend present findings and to identify which other variables influence each other. For example, reciprocal effects may also occur between job and personal resources and irritation because of the dynamic character of psychological processes (cf. Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009), as

well as between work demands and WFC, such as that work-load and WFC are reciprocally interconnected (cf. Dikkers et al., 2007b).

For a more extended development of theoretical implications and to understand the full range of work-family interplay with mental health, particularly in samples of employed family caregivers, it would be interesting to include positive aspects such as enhancement, spill-over or facilitation in this model. Furthermore, as mentioned in the theory section, work and family domains interact with each other bidirectionally. It would therefore be worthwhile to integrate family-work interference and enhancement aspects in this model. For example, Graves et al. (2007) found, against their expectations, that family role commitment did not increase family-work interference, but increased family-work enhancement and thereby was also beneficial for lower psychological strain and better work performance. Additionally, Hepburn and Barling (1996) found that parent-care interference with work was associated with partial absence from work. Moreover, an early study conducted by Scharlach and Boyd (1989) showed that this role conflict was also related to health. Therefore, it is important for research and also for practical implications for organizations to consider the positive and bidirectional aspects of work-family interplay as well. Furthermore, the question of whether there are distinct positive and negative processes or if these are interconnected should be investigated (cf. Peeters et al., 2009).

For the more extended development of practical implications, future research should also take individual coping strategies into account. Especially in the case of irritation, it would be very interesting to learn how people use their goal adjustment strategies like abandoning an unreachable goal and how fast they can reengage in other goals, which are more appropriate to the changed (care) situation (cf. Wrosch et al., 2011).

Regarding sample choice, future research could take a more person-oriented approach into account, which investigates the model for different types of couples, e.g. high parent care demand couples, high child care demand couples and high work demand couples (cf. Cullen, Hammer, Neal, & Sinclair, 2009). This would be interesting because most people do not care alone, and caregiving often has influence on caregivers' partners. Further, the intensity of caregiving is crucial for mental health. Previous research has shown that increased caregiving hours (Lee et al., 2001), home

care situations (Kossek et al., 2001) and more eldercare demands (Zacher et al., 2012) decrease well-being. Barling et al. (1994) found that a higher involvement in caring responsibilities predicted eldercare interrole conflict, which, in turn, increased psychological strain. In the present study, the care level of the dependent ( $r = -.03$ , ns), caregiving hours ( $r = .08$ , ns) and being the main carer ( $r = -.03$ , ns) were not related to irritation. Therefore, another aspect is crucial: Caregiving persons who are satisfied with their eldercare tasks perceive their “responsibility as important, meaningful, and even rewarding part of their lives” (Zacher et al., 2012, p. 54). These positive emotions are a potential resource that helps caregivers to accept that, due to their caregiving responsibilities, they have more restricted resources for other domains (Zacher et al., 2012). Therefore, it is assumed that these positive emotions protect against resource loss and improve resource gain, which, in turn, is assumed to reduce stress and is beneficial for mental health. Zacher et al. (2012) found an interaction effect of eldercare demands and satisfaction with elder care tasks on mental health. Thus, caregivers with high satisfaction with eldercare tasks have better mental health under conditions of high eldercare demands than dissatisfied caregivers.

Additionally, Lee et al. (2001) showed that women who cared for elders had more depression symptoms than males. Contrary to this finding, in the study conducted by Reid et al. (2010), a relation between caregivers’ gender and well-being was not found. In the present study, gender correlated only slightly with irritation ( $r = .12$ ,  $p < .01$ ) and women had significantly lower irritation than men (women:  $M = 3.25$ ,  $SD = 1.46$ ; men:  $M = 3.63$ ,  $SD = 1.55$ ). Because these results were not really convincing and there are much more inconsistent findings (Amirkhanyan & Wolf, 2006; Robison et al., 2009), this gender difference was not focused in this study. Nevertheless, future research should clarify the question of whether gender has significant impact on the caregivers’ health status and the relations to antecedents and consequences.

## **Conclusion**

Contrary to the popular opinion of HR experts as stated at the beginning of this paper, this study showed that strains of employees with family caregiver responsibilities are not to be exclusively encountered with cost-intensive arrangements, which are only useful for a small group of employees. It is rather a question of resources, such as a family-friendly culture in the company and the reinforcement of individual perceptions



such as health-related self-efficacy. These resources could be influenced by day-to-day behavior and HR development trainings. Moreover, this study showed that work family interferences and irritations are interconnected and influence each other. Therefore, it can be concluded that it would be necessary to work together on resource enhancement and strain reduction with experts from different areas of the organization.

## **5. Study III: The Relationship of Work-Family Interplay and Cortisol as a Biomarker of Stress**

### **5.1 Introduction**

The challenges of the work-home interface are an integral part of “the nature of modern working” (Weinberg & Cooper, 2011, p. 156). Inter alia, role demands have impact on the stress level of employees (Pandey, Campbell Quick, Rossi, Nelson, & Martin, 2011), which, in turn, can have physiological and psychological outcomes. The current assumption is that aspects of the work-family domain can have both positive and negative impacts on well-being (Mullen et al., 2008). Two aspects are taken into account in the present study: the interference in family life by work demands (WFC), and the employee perception that – as a result of different conflict and positive enrichment experiences – all in all role expectations of relevant others are fulfilled (WFB). The study aims at investigating whether these aspects of work-family interplay are associated with an objective stress indicator, and the influence resilience as a resource has on these variables.

On the subject of work-family interface, much research has been done focusing on subjective self-reported psychological aspects. However, examinations using objective and physical stress indicators are rare in the work-family research domain. Only “a small number of studies have assessed specific physical conditions such as blood pressure, hypertension, cholesterol level, [or] the secretion of cortisol that reflects the hypothalamic-pituitary-adrenal response to stress [...]” (Greenhaus et al., 2006, p. 70). A few researchers have investigated different work or family characteristics in relation to cortisol release (cf. Repetti, Wang, & Saxbe, 2011). Still, to the author’s knowledge, none of them has considered the experience of work-family conflict or balance, respectively. The inclusion of cortisol as an objective biomarker of stress in combination with WFC and WFB is the central strength of this study and contribution to existing literature because it will indicate if work-family challenges have impact on individuals beyond their subjective experience. In doing so, this study should provide the first indications as to whether and why organizations really should care about work-family integration.

Moreover, personality variables are important antecedents of work-family interplay and mental health (Allen et al., 2012; Frone, 2003; Zhang & Liu, 2011). “People who are resilient display a greater capacity to quickly regain equilibrium physiologically, psychologically, and in their social relations following stressful events” (Zautra, 2009, p. 1935). Since resilience has not yet been investigated within the work-family domain, the present study explores if being resilient is a beneficial resource regarding work-family challenges and well-being.

In the following part of the paper the variables of work-family interplay will, at first, be defined and then theoretically substantiated by the COR theory. Secondly, existing research on the relationship between WFC and WFB focusing on stress will be described. Because research using objective stress indicators is lacking, cortisol as a stress hormone in work-family interplay is introduced, and the need for satisfactory research is argued. Thirdly, there follows the depiction of resilience as a resource in the stress process and moreover, resilience as a resource in work-family interplay.

## **5.2 Theoretical Background**

### **Work-family interplay**

The interplay between work and family roles can have both positive and negative consequences (Frone, 2003; Greenhaus & Allen, 2011). Thus, role demands can interfere with each other and hence cause role conflicts. Furthermore, the transfer of positive mood and competences as well as the compensation between both domains can result in positive effects for individuals (Wiese et al., 2010). WFC is the most studied aspect of the work-family interface (Greenhaus & Allen, 2011). Further, “WFC is of particular interest to occupational health psychologists because of its relationship with a variety of psychological and physical health outcomes” (Greenhaus & Allen, 2011, p. 166). WFC occurs if “participation in the work (family) role is made more difficult by virtue of participation in the family (work) role” (Greenhaus & Beutell, 1985, p. 77). According to Carlson and Frone (2003) it is important to differentiate between possible sources of conflict experience. On the one hand, role demands can be generated externally. Thus, if the time demands of work (e.g., shift work) interfere with the time demands of family life (e.g., helping the children with homework after school), external WFC occurs. On the other hand, internal WFC results if the different requirements of roles are internally (cognitively and emotionally) generated. As an example, internal

WFC emerges if someone is worrying about meeting a deadline while caring for elderly parents at home.

In recent years the positive side of the interaction of work and family domains (enrichment, facilitation, positive spill-over, etc.; cf. Greenhaus & Allen, 2011; Poelmans et al., 2008; Wayne, 2009) has gained researchers' attention. Nowadays, the overall concept of all different facets of the work-family domain seems to be more appropriate for practical implications, but fundamental research is still needed. This global concept is called WFB. In accordance with previous research and theoretical discussions, balance did not indicate investments of the same proportions of time, energy, etc. in both domains (cf. Halpern & Murphy, 2005). Rather, WFB is defined as the "accomplishment of role-related expectations that are negotiated and shared between an individual and his or her role-related partners in the work and family domains" (Grzywacz & Carlson, 2007, p. 458). Despite other existing definitions of WFB (see Carlson et al., 2009a; Frone, 2003; Greenhaus & Allen, 2011; Grzywacz & Carlson, 2007) this definition accords with an original understanding of role-theory, which claims that "the optimally healthy, balanced individual avoids role strain not by restricting the number of roles they identify with or by prioritizing one role over another, but by actively expanding their role identities within a fluid sense of self" (Carlson et al., 2009a, p. 1464). Thus, WFB results if expectations of relevant others are met, and not if there is no conflict or no challenge in combining work and family life. Therefore, WFB rather is a global summary of perception with regard to the social context of the individual. In contrast, WFC is more specific in so far as it is an evaluation of how frequently role-related demands of both domains are behaviorally or time-wise incompatible with each other. WFC and the positive interaction of the work and family domain (work-family enrichment) have influence on the perception of WFB, but there are also other predictors of WFB (Carlson, Wayne, & Harris, 2009b). So, while WFB is influenced by WFC, WFB is more than the absence of WFC. Carlson et al. (2009b) showed that WFB is not only theoretically but also empirically distinct from WFC and work-family enrichment. Further, it explains additional variance in organizational outcome criteria, e.g. organizational commitment and job satisfaction. Butler, Bass, and Grzywacz (2009) argue that „balance may be more strongly related to outcomes of interest such as health and well-being than more narrowly defined constructs such as work-family conflict" (p. 12). However, their assumption is

speculative because relevant research is still lacking and therefore the influence of WFB on health is one of the first topics on the agenda for future research, as noted by Greenhaus and Allen (2010).

### **The conservation of resources theory with regard to work-family interplay**

Down to today, this research gap has not been sufficiently closed. According to the COR theory (Grandey & Cropanzano, 1999; Hobfoll, 1989; 2001; 2011; Hobfoll & Wells, 1998), it is assumed that stress and impaired health result if resources are threatened or lost, or if resource gain is lacking after significant resource investment. Therefore, “the basic tenet of COR theory is that individuals strive to obtain, retain, protect, and foster those things that they value” (Hobfoll, 2001, p. 341), especially in work and family domains which are characterized by high involvement (cf. Carlson & Frone, 2003; Michel et al., 2011). “Resources are defined as those objects, personal characteristics, conditions, or energies that are valued by the individual [...]” (Hobfoll, 1989, p. 516). In the work domain these resources are, for example, time for work, feelings of successfulness, adequate income and financial stability as well as appreciation from the employer (Hobfoll, 2001). Regarding the family domain Hobfoll (2001) mentioned, inter alia, family stability and time with loved ones. Further, the feeling of having control over one’s own life is likely to be the most meaningful resource regarding work-family interplay. Since many aspects mentioned in this theory are very important in the work-family context (cf. Carlson et al., 2009b), it is assumed that this theory is best suited to predict the relationship between work-family variables and health outcomes. Further, in contrast to role theory, which assumes that multiple roles compete for limited resources, the COR theory not only assumes resource loss due to multiple roles, but also anticipates resource gain coming along with an increasing number of roles. In the case of WFC “the COR model proposes that inter-role conflict leads to stress because resources are lost in the process of juggling both work and family roles” (Grandey & Cropanzano, 1999, p. 352). WFB is supposed to be a resource because expectations regarding work and family domains are met if, for example, enough time for both roles is available at a satisfactory level. With regard to COR theory, McNall, Nicklin and Masuda (2010) furthermore argue that “people with resources are less likely to encounter stressful circumstances that negatively influence both physical and psychological well-being” (p. 382). In the sense of a gain spiral,

feelings of control over one's own life and self-efficacy are likely to be stronger in a balanced situation, which is assumed to be beneficial for the mental health status.

### **Existing research into the relationship between WFC and WFB with regard to stress**

Previous research supports the assumptions mentioned above. More precisely, WFC has been sufficiently investigated via self-report data in relation to various health outcomes (cf. Bianchi & Milkie, 2010; Greenhaus et al., 2006; Mullen et al., 2008). For example, Frone (2000) found that WFC is related to different psychiatric disorders. Furthermore, meta-analytic findings by Amstad et al. (2011) confirm a positive association between WFC and health problems ( $r_w = .28$ ), psychological strain ( $r_w = .35$ ), somatic/physical symptoms ( $r_w = .29$ ), depression ( $r_w = .23$ ), stress ( $r_w = .54$ ), and anxiety ( $r_w = .14$ ). Further, longitudinal research approaches regarding the (recursive) relation between WFC and health outcomes are heterogeneous (cf. Bianchi & Milkie, 2010; Greenhaus & Allen, 2011; Mullen et al., 2008). In contrast, there is less research focusing on the positive effects of work-family interplay in relation to health (Mullen et al., 2008). Nevertheless, most existing results indicate that positive work-family experiences are beneficial for mental health and well-being as well as physiological health (Greenhaus & Allen, 2011; Mullen et al., 2008; Odle-Dusseau & Britt, 2011; Poelmans et al., 2008). For example, in their meta-analytic review on the basis of ten studies, McNall et al. (2010) found a positive relationship between work-family enrichment and physical and mental health ( $\rho = .21$ ). More precisely, WFB itself is also assumed to improve individual well-being (Voydanoff, 2009), but, as mentioned above, sufficient research is lacking. Therefore, Greenhaus and Allen (2011, p. 177) call on “researchers [...] [to] examine the factors that contribute to feelings of work-family balance as well as the effect of balance on important life outcomes, including psychological and physical health”.

### **Hormones as an objective biomarker of stress and the lack of sufficient research regarding work-family interplay**

One often-used objective indicator of stress in stress research is cortisol. Beside epinephrine and norepinephrine, cortisol is one of „the most important stress hormones” (Lundberg, 2011, p. 531). Concerning its point of origin, cortisol is one of the hormonal

end results of the activation of the hypothalamic-pituitary-adrenocortical (HPA) axis (Repetti et al., 2011). According to Lundberg (2011, p. 531), “activity in the two most important stress systems [the sympathetic adrenal medullary system and the HPA axis] not only serves as a biomarker of stress, but these hormones also form a link between psychosocial stress exposure and various stress-related health problems”. In general, short-term physiological activation in acute stress situations is important for quick reactions. Over a longer time period, however, if recovery processes fail, these activations are dysfunctional for the immune system (Lundberg, 2005, Lundberg, 2011; Repetti et al., 2011). Generally, cortisol levels are higher in critical situations with high ego-involvement (Bergman, Ahmad, & Stewart, 2008; Hellhammer, Wüst, & Kudielka, 2009; Kirschbaum & Hellhammer, 1994). For instance and as mentioned above, involvement is high in situations of WFC (cf. Carlson & Frone, 2003). Additionally, the HPA-axis is sensitive, inter alia, to social stressors (Pendry & Adam, 2007) and social-evaluative threats (Dickerson & Kemeny, 2004; Krajewski, Sauerland, & Wieland, 2011), which can occur if role expectations are not met. Therefore, it is assumed that the constructs of internal and external WFC are associated with increased cortisol release. Further, positive emotions and psychological well-being are linked with decreased cortisol levels (Lundberg, 2011). WFB is associated with positive emotions. Consequently, it is assumed that the construct of WFB is related to lower mean cortisol release.

To the author’s knowledge, existing research has not yet investigated these presumptions. Nevertheless, research into comparable topics will be depicted briefly: For example, in a sample of physicians, Bergman, Ahmad and Stewart (2008) found a combined effect of sex and responsibility at home on the mean cortisol release measured at four points on one day. In a male sample, van Eck et al. (1996) found increased cortisol levels due to daily stressors, in particular if these stressors were still present or occurred frequently. Another study by Hurwitz Eller et al. (2006) showed that strong feelings of time pressure in daily life were significantly related to higher cortisol release in both genders. The concept of time pressure is not identical to external WFC, but it is a first hint of a possible relationship between external WFC and cortisol. In accordance with this preliminary evidence obtained from earlier research on other health indicators, and based on theoretical underpinning of the COR theory, it is assumed:

*H1: Internal WFC (H1a) and external WFC (H1b) are positively associated with the cortisol level, whereas WFB (H1c) is negatively associated.*

### **Resilience as a resource in the stress process**

Initiated by Antonovsky's work (1987), several personality variables have been identified which help some people to buffer stressors and keep them healthier than others under comparable conditions. According to Hobfoll (2001, p. 342), a "positive feeling about myself" is one potential resource in the framework of the COR model. This is also one aspect of resilience. Resilience is a multidimensional construct, which comprises trait-characteristics as well as capabilities for successfully coping with strain (Leppert, Koch, Brähler, & Strauß, 2008). In this study, I concentrate on resilience as mental resistance and therefore, on its trait aspect. According to Tugade and Fredrickson (2007, p. 318), "psychological resilience has been characterized by (1) the ability to bounce back from negative emotional experiences and by (2) flexible adaption to the changing demands of stressful experiences". Thus, the trait element in resilience is characterized by effective adaptive behavior in challenging situations and the ability to recover successfully after stressful situations (Tugade & Fredrickson, 2007). According to COR theory, personal characteristics such as resilience are helpful in the prevention of resource loss and therefore should be beneficial for mental health. Research findings show that the degree to which an individual possesses personality traits like perfectionism or OC can influence cortisol levels (Lundberg, 2011). Specifically, an experimental study conducted by Mikolajczal, Roy, Luminet, and de Timary (2008) found that men with high scores on the trait "resilience" had significantly lower overall salivary cortisol secretion than men with a low resilience score. As a result, more research is needed to assess the relationship between resilience and cortisol in men as well as in women. On the basis of COR theory and first empirical findings, it is hypothesized:

*H2: Resilience is negatively associated with the cortisol level.*

### **Resilience as a resource in work-family interplay**

As mentioned above, resilience is one important resource for mental health because this trait affects the experience of stressors and their coping-style. Taking work-family interplay into account, Grandey and Cropanzano (1999, p. 353) assume that



“with more resources, work stress and work interfering with family becomes less likely”. Existing research confirms this assumption in terms of other personality variables and the work-family interface: For example, Michel et al. (2011) showed in their meta-analysis that internal locus of control is negative ( $r_w = -.15$ ), and negative affect (neuroticism) is positive ( $r_w = .31$ ) related to WFC. Another meta-analysis by Allen et al. (2012) found that trait-based variables such as neuroticism or negative affect increase WFC, whereas trait-based variables such as positive affect or self-efficacy are associated with lower WFC. Furthermore, health-promoting personality characteristics such as self-efficacy or agreeableness are, in general, negatively related to WFC (Zhang & Liu, 2011). In particular, individuals with a strong manifestation of resilience use strategies of positive emotions and optimistic thinking while dealing with stressors (Tugade & Fredrickson, 2007). Highly resilient individuals are capable of realistically estimating challenges in their lives and finding positive aspects in problematic situations (Tugade & Fredrickson, 2004). This is in accordance with the understanding of successful work-family interplay underlying the present study, namely that WFB does not mean full absence of conflicts, but that, in general, role expectations are fulfilled. Thus, the more resilient someone is, the more he/she uses positive emotions for coping and will therefore have more feelings of WFB and fewer experiences of internal and external WFC. Given the fact that, to the author’s knowledge, no study has yet investigated this relationship, the following hypothesis, derived on the basis of the theoretical assumptions, will be investigated:

*H3: Resilience is negatively associated with internal (H3a) and external WFC (H3b), but positively associated with WFB (H3c).*

## **5.3 Method**

### **Study design**

The study’s aim was to investigate the association between the psychological constructs of work-family interplay, resilience, and cortisol as an objective physiological stress indicator. For this purpose, participants were recruited via personal contact. According to eligibility criteria, participants had to be employed, had as a minimum to care for one child under the age of six, and were to not be pregnant at the time of the study. The criterion of young children in the household was set because

those employed parents are likely to have the greatest difficulties integrating work and family roles. Further, research showed that parents of younger children have more difficulties recovering and experience more daily stress (Repetti et al., 2011). People who fulfilled these criteria were provided with a description of the procedure, a questionnaire, three devices called Salivettes for the cortisol samples, one salivary cortisol collection protocol, and a self-addressed stamped envelope. A paper-pencil survey was used to assess demographic variables, work-family constructs, resilience, and possible confounding variables. The participants collected three saliva samples on a single day using the Salivettes. After the cortisol self-collection, completion of the questionnaire and the protocol, they were requested to store the Salivettes in the freezer before sending back the complete envelope. Participants received no compensation for their participation in this study.

### **Sample**

Forty complete envelopes were sent back. Five participants were excluded because of extreme outliers with regard to the cortisol values. 54 % of the final sample were female. The mean age was 33 years ( $SD = 5.2$ ). The youngest participant was 21, and the oldest was 43 years old. Most of the participants (89 %) were married (9 % were in 'consensual union' and 3 % were divorced). All participants had at least one child (54 % had one child, 40 % had two children, 6 % had three or more children). 60 % of them had at least one child under the age of three. The others had at least one child under the age of six. Care for dependent people, for example elder care responsibilities, was provided by 9 % of the sample. All participants were economically active. Most of them worked full-time (i.e., more than 35 hours per week: 60 %; 31 % part-time, i.e., between 16 and 35 working hours, and 9 % were minor employed) and had the following occupations: 69 % employees; 17 % civil servants, 9 % self-employed, 3 % apprentices and 3 % students. 42 % had a university degree and 31 % had a high school qualification for university. Participants had a mean professional experience of 8.39 years ( $SD = 5.31$ ). Regarding leadership, 26 % of the sample had disciplinary responsibilities for followers. With regard to possible confounders of the cortisol values, 34 % were smokers who smoked 8 cigarettes per day on average. Using the body mass index (BMI), 60 % of the sample had normal weight, 37 % overweight and 3 % were

obese<sup>1</sup>. Of the participants 89 % had no diseases, 3 % had mental disorders and 9 % had other chronic diseases. Regarding other hormonal influences, 53 % of the women did not use hormonal contraception, 21 % used the pill and 25 % used contraceptive coil, three-month injections or minipill.

## Measures

**Work-family conflict.** Internal and external WFC were measured with three items in each case using the German version (see Seiger & Wiese, 2009) of the WFC scale developed by Carlson and Frone (2003). One example for internal WFC is: “When you are at home, how often do you think about work-related problems?” An example for external WFC is: “How often does your job or career interfere with your responsibilities at home, such as yard work, cooking, cleaning, repairs, shopping, paying the bills, or childcare?” Answers were given on a five-point Likert-scale ranging from 1 (“never”) to 5 (“always”). The scales were reliable with Cronbach’s alpha .88 for external WFC and .85 for internal WFC, respectively.

**Work-family balance.** WFB was assessed using a German translation of the work–family balance measure from Carlson, Grzywacz, and Zivnuska (2009a). Participants were asked to indicate their (dis-/)agreement with 6 items on a 5-point Likert-scale, which ranged from 1 (“I strongly disagree”) to 5 (“I strongly agree”). Sample item is: “I do a good job of meeting the role expectations of critical people in my work and family life.” Reliability of this scale was good with Cronbach’s alpha .86.

**Cortisol.** Cortisol can be assessed via blood, urine or saliva (Kirschbaum & Hellhammer, 1994, Kirschbaum & Hellhammer, 2000; Lundberg, 2011). In contrast to other procedures, saliva collection procedure is non-invasive, stress-free and laboratory independent (Kirschbaum & Hellhammer, 1994). Therefore, it can be assessed in the natural environments of the individuals (Kirschbaum & Hellhammer, 2000). Additionally, saliva cortisol is a valid and reliable indicator concerning the corresponding hormone collected by blood samples (Kirschbaum & Hellhammer, 1994). Each saliva sample was collected by using one Sarstedt Salivette (Nümbrecht, Germany). Participants were instructed to self-collect the saliva samples at three typical

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<sup>1</sup> The body mass index (BMI) was calculated by weight in kilograms divided by the square of the height in meters. For categorizing the World Health Organization (WHO, 1995) cut-off points: underweight BMI < 18.5, normal BMI = 18.5–24.9, overweight BMI = 25–29.9; obese BMI > 30–39.9 were used.

points in time on one day. They had to record the exact times in the protocol provided to ensure compliance and to have the opportunity to exclude non-compliant participants. Further, they were instructed to avoid eating, drinking, smoking and teeth brushing thirty minutes before each saliva collection. The cortisol values were assayed in the laboratory at Dresden University of Technology (Chair of Biopsychology) in Germany. The concentrations of salivary cortisol were identified by a chemiluminescence immunoassay. The intra-assay and inter-assay variability were both below 10 %. For the statistical analyses the mean score of the three cortisol measures on one day was used (cf. Bergman et al., 2008). The mean cortisol level is associated with the area under curve ( $r = .78, p < .01$ , Hoppmann & Klumb, 2006), which is often used by researchers who analyze cortisol secretion (cf. Fekedulegn et al., 2007).

**Resilience.** Resilience-Scale (RS-11), developed by Schumacher, Leppert, Gunzelmann, Strauß, and Brähler (2005), was used in this study. This scale focuses on the assessment of resilience as a trait factor. One of the 11 items is “I can handle several tasks simultaneously.” Answers were given on a 7-point Likert-scale of (dis-)agreement (1 = “I strongly disagree” to 7 = “I strongly agree”). Cronbach’s alpha for this scale was .87.

### **Analytical strategy**

Pearson correlations were used to examine possible influences on cortisol samples. In case of nominal independent variables,  $Eta^2$  was used. Further descriptive analyses were calculated by using IBM SPSS Statistics 20. In order to assess the contribution of the work-family constructs and resilience to the mean cortisol level, partial least squares structural equation modeling (PLS-SEM with SmartPLS 2.0) was used because of the small sample size and the study aim to predict cortisol release (cf. Hair, Ringle, & Sarstedt, 2011; Hair, Sarstedt, Ringle, & Mena, 2012; Ringle, Sarstedt, & Straub, 2012). All latent variables were defined as reflective models with exception of the single indicator model of cortisol. Due to the small sample size, item-composites were created (cf. Bandalos, 2002; Landis, Beal, & Tesluk, 2000), because the inclusion of each item as an individual indicator would require a larger sample size (Landis et al., 2000). For the mean cortisol value a single-item approach was chosen. This is in accordance with the total aggregation model described by Landis et al. (2000). With

regard to the other latent constructs, the items were combined into two parcels per scale. With regard to Landis et al. (2000) these are partial aggregation models.

According to Hair et al. (2011) several steps are necessary for model evaluation: The composite reliability (internal consistency reliability) and the indicator loadings (indicator reliability) of the measurement model should be above .70. With regard to the convergent validity the average variance extracted (AVE) should be higher than .50 (Hair et al., 2011; Weiber & Mühlhaus, 2009). The Fornell-Larcker criterion of discriminant validity is fulfilled if the AVE of each latent construct is higher than the highest squared correlation with the constructs (Hair et al., 2011). Regarding the structural model, the standardized paths are inspected first. If these are above .20 or higher, they are considered to be meaningful (Chin, 1998a). To analyze the significance of the paths, bootstrapping is necessary (Hair et al., 2011). In this study critical t-values above 1.96 (significance level of 5 %) were used. Hair et al. (2011) proposed that  $R^2$  values of 0.75, 0.50, or 0.25 for latent variables are substantial, moderate, or weak, respectively (Hair et al., 2011). But it is also noted that these reference values are strongly related to the research context. Additionally, the effect size  $f^2$  was calculated. According to Gefen et al. (2011),  $f^2$  values of 0.02, 0.15, and 0.35 are small, medium, and large effects (cf. Chin, 1998b). Lastly, because the final model indicates a multiple mediator model, the indirect effects are assessed using the procedure described by Preacher and Hayes (2008), which relies on the bootstrapping method.

## 5.4 Results

Means, standard deviations, reliabilities and bivariate correlations are presented in Table 6. According to Schumacher et al. (2005), with regard to resilience, the sum score was used. In comparison with the norm values with a percentile rank of 60, the investigated sample was slightly more resilient than the norm population. Even the cortisol levels were in line with normal mean values of salivary cortisol (Kirschbaum & Hellhammer, 2000). Results of inter-correlations between potential confounding variables (cf. Kudielka, Hellhammer, & Wüst, 2009; Lundberg, 2011; Rösler et al., 2010) and the cortisol mean score showed that influences were only marginal. Therefore, the following variables were not included in further analyses: age ( $r = .00$ , ns), gender ( $Eta^2 = .03$ ), number of children ( $r = .11$ , ns), care for relatives ( $Eta^2 = .05$ ),

smoking ( $Eta^2 = .02$ ), use of hormonal contraception ( $Eta^2 = .14$ ), diseases ( $Eta^2 = .01$ ) and BMI ( $r = .31$ , ns).

External WFC ( $r = .23$ , ns), internal WFC ( $r = -.18$ , ns) and WFB ( $r = -.25$ , ns) were not significantly associated with the mean cortisol release. Resilience ( $r = -.45$ ,  $p = .00$ ) was strongly and significantly negatively related with the mean cortisol level (see Table 6).

Table 6

*Means, Standard Deviations, Internal Consistencies and Correlations of the Study Variables of Study III*

	M	SD	1	2	3	4	5
1 Cortisol mean	9.79	2.67	-				
2 External WFC	2.90	1.02	.23	(.88)			
3 Internal WFC	2.87	0.91	-.18	.29*	(.86)		
4 WFB	3.90	0.68	-.25	-.15	-.35**	(.86)	
5 Resilience	60.97	9.68	-.45***	-.08	-.11	.50***	(.87)

*Note.*  $N = 35$ . \* = .10; \*\* = .05; \*\*\* = .01 two-tailed.

Regarding the measurement model, composite reliabilities were above .85; thus, reliability of all scales was good (cf. Gefen et al., 2011; Hair et al., 2011). Further, all indicator loadings were above .89. Also convergent validity was given, because all AVEs were above .87. The Fornell-Larcker criterion was complied; thus, discriminant validity was given.

After bootstrapping, the following results were received: Internal WFC was negatively related to cortisol ( $\beta = -.34, t = 2.15, p < .05$ ), thus contrary to H1a in the negative direction of the relationship. External WFC (H1b) was positively associated with the mean cortisol level ( $\beta = .29, t = 2.29, p < .05$ ). Therefore, H1b was confirmed. WFB had no influence on cortisol ( $\beta = -.12, t = 0.60, ns$ ); thus H1c was rejected. The strongest predictor of cortisol was resilience ( $\beta = -.41, t = 2.11, p < .05$ ). Accordingly, results confirmed the decreasing influence of resilience on the mean cortisol level (H2). Additionally, no support was found for H3a and H3b, because resilience had no significant influence on internal (H3a;  $\beta = -.11, t = 0.72, ns$ ) and external WFC (H3b;  $\beta = -.17, t = 1.01, ns$ ). The strongest association was found with regard to the positive influence of resilience on WFB (H3c;  $\beta = .57, t = 5.61, p < .00$ ). The full-model explained good proportions of the mean cortisol level ( $R^2 = .34$ ) and also of WFB ( $R^2 = .33$ ). According to Chin (1998b), these are moderate effects. In accordance with these results, the effect size was small for the influence of WFB ( $f^2 = 0.01$ ) on cortisol, and was medium for the influences of internal ( $f^2 = 0.14$ ) as well as external WFC ( $f^2 = 0.11$ ) and resilience ( $f^2 = 0.17$ ) on cortisol. According to Preacher and Hayes (2008), no mediating effects were found. In Figure 9, all path coefficients, their significance levels, and  $R^2$  values are presented.



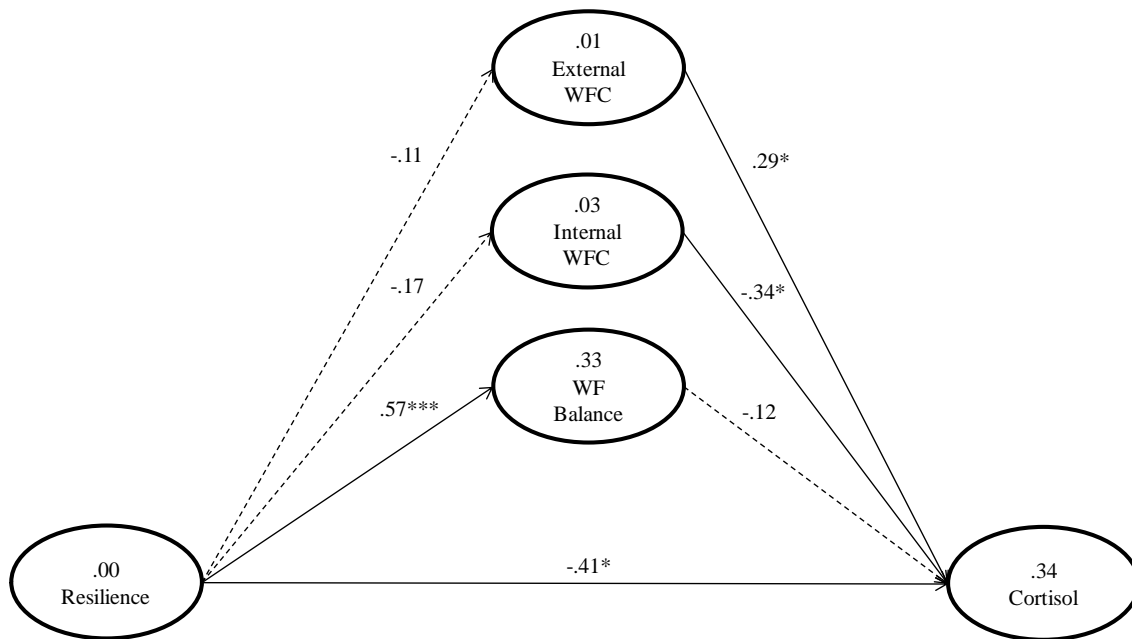


Figure 9. Summary of the results of Study III.  $N = 35$ . \* = .05. \*\* = .01. \*\*\* = .001 two-tailed.

## 5.5 Discussion

Summarizing the study results, first indications that especially the negative aspects of the work-family interplay are important for cortisol as a biomarker of stress were found. More precisely, external WFC was positively associated with cortisol secretion, whereas internal WFC was negatively related to the mean cortisol level. The strength of these associations was moderate. But, due to the fact that the sample size was really small, these effects are strong enough to be relevant indicators of this relationship, specifically because “perceived stress can only be expected to be moderately associated with salivary cortisol” (Hellhammer et al., 2009, p. 168). The negative relationship between internal WFC and cortisol was contrary to the hypothesized direction. It was assumed that thinking about work problems while staying at home should result in interference with family demands and stress. On the other hand, this is a similar concept to irritation (cf. Mohr et al., 2006; Mohr et al., 2005b), which means psychological emotional and cognitive strain between actual and chronic stress. Internal WFC and irritation, in particular, have work-related rumination in common. According to Müller et al. (2004), if the time period involved is not too extended, these ruminations lead to increased efforts in the achievement of objectives.

Maybe in the case of cortisol secretion, these increased efforts reduce stress, because individuals work on solutions for their problems. But in order to prove this assumption, more research is needed.

Contrary to the hypothesis, this study found no significant effect of WFB on cortisol. It may be that positive variables are generally less associated with indicators of illness. This assumption is in accordance with the study by Van Eck et al. (1996), who found significant effects on cortisol of state-like negative affect, but no significant effect of state-like positive affect. Additionally, this is in line with the principle 1 of the COR theory, which claims that resource loss has much more impact than the same extent of resource gain (Hobfoll, 2001). In contrast to the assumption of Butler, Bass, and Grzywacz (2009) described above, it therefore is concluded that WFC has stronger impact on health than WFB. This principle is explained by the negativity bias, which states that negative information weighs more strongly than positive, and furthermore, that reactions to the loss of key resources are more deeply anchored in our physiology. Resource gain, in contrast, becomes more important in confrontation with resource loss. As a conclusion of this consideration, further research should investigate the relationship between WFB and positive health indicators such as work engagement (cf. Bakker & Leiter, 2010; Langelaan, Bakker, Schaufeli, van Rhenen, & van Doornen, 2006).

With regard to the association between resilience and cortisol, this principle was not confirmed. In line with the hypothesis, resilience had strong negative impact on the mean cortisol level. This may be the case, because resilience is a very essential key resource which influences not only work and family lives but all aspects of an individual's life (the self, leisure time, etc.).

Resilience had no significant influence on both types of WFC, but very strong influence on WFB. Thus, the ability to bounce back has no influence on possible interferences between work and family life, but affects the overall evaluation if expectations of work and family domains are fulfilled. This result is easily comprehensible, because resilience as well as experiences of WFB not exclude challenging or problematic incidents in daily life. To be very accurate, future research should model WFB somewhat later than WFC, because, *inter alia*, these conflicting aspects can influence WFB in a way (cf. Butler et al., 2009; Greenhaus & Allen, 2011; Voydanoff, 2009). But in this study, as expected, WFB was lowly to moderately

associated with internal and external WFC. Hence, it was decided to model all work-family variables in-between the trait and the health outcome, which is similar to the basic model by Kristensen, Smith-Hansen and Jansen (2005). As a conclusion of this hypothesis, researchers should take resilience in relation to positive effects of the work-family interplay into account.

### **Strengths and limitations**

The most important strength of this study is the use of an objective biomarker of stress in the work-family research domain. Therefore, as a result of using different sources of data selection (questionnaires and Salivettes), the common method bias was reduced (cf. Gefen et al., 2011; Podsakoff et al., 2003). But this study was limited in sample size and cortisol collection. It would be necessary to validate these results by using at least four points in time for saliva collections per day, on more than one day, to improve reliability (cf. Hellhammer et al., 2007; Krajewski et al., 2011; Rösler et al., 2010; van Eck et al., 1996). Furthermore, with regard to the research question, different cortisol indexes could be chosen (e.g., CAR, area under the curve or recovery values). But nevertheless, this study is believed to be the first investigation of the question of whether the work-family interface is generally associated with cortisol. For that reason, the global cortisol indicator of three measures on one day is an appropriate and economic approach.

Further, it would be insightful to control for work and leisure days. Most studies show significant differences between cortisol levels on working versus on leisure days (Fries, Dettenborn, & Kirschbaum, 2009; Langelaan et al., 2006; Schlotz, Hellhammer, Schulz, & Stone, 2004), but in case of work-family studies it is assumed that conflict as well as balance experiences are not restricted to work days and therefore, in this study, this differentiation was not made. In general, more antecedent variables should be used to achieve a fuller and more realistic model. Work, but also family variables are important, because, for example, Repetti, Wang and Saxbe (2011) stated that family demands in themselves may also increase the cortisol secretion: “Families can sometimes function as havens where recovery takes place after a stressful day; at other times, stress spills over from the workplace into the home or is even exacerbated by a contentious home environment” (p. 291). Furthermore, cortisol levels of partners are associated with each other (Saxbe & Repetti, 2010) and should therefore be controlled. Even the cortisol levels of children can be influenced by family functioning (Pendry

& Adam, 2007). In relation to work variables, it would be interesting to examine how leadership behavior can influence cortisol secretion with regard to the work-family domain. For example, Rowold and Heinitz (2008) showed that different aspects of transformational leadership have influence on stress responses. But which of these aspects are beneficial for family-friendly leadership and culture, and therefore reduce stress-levels objectively? The answer to this question could be very informative for the discussion of how female managers with significant family responsibilities can reach top management positions (cf. Cheung & Halpern, 2010). In the work-family and cortisol research, gender differences are interesting (cf. for cortisol research: Fries et al., 2009; Kudielka et al., 2009; Lundberg, 2011). This is also true for the research questions of this study, because, for example, Schneewind et al. (2010) found stronger negative relationships between WFB among women than among men for both personal distress and global stress. Moreover, Kurina, Schneider, and Waite (2004) found in a sample of employed parents that the average cortisol secretion was increased in men who had severe symptoms of anxiety and in women who experienced more stress at work. But this differentiation is advisable for studies with a greater sample size. In conclusion, there are various variables which may have impact on cortisol secretion and which were not all controlled in this study. Nevertheless, this study found first empirical evidence that WFC and resilience considered in one model have influence on this biomarker of stress.

### **Practical implications**

Provided that further research validates these findings, a reduction in WFC and a strengthening of resilience would be advisable to improve mental health. First of all, for the reduction of WFC, a family-friendly organizational culture including family-friendly management, family-friendly working times and no negative career consequences from using family-friendly arrangements should be implemented and evolved (cf. Allen, 2001; Krisor et al., 2011; Michel et al., 2011; Thompson et al., 1999; Wiese, 2004). This would be additionally beneficial for WFB, because the positive influence of family-friendly supervisors on WFB is mediated through reduced WFC (Greenhaus, Ziegert, & Allen, 2012). Further, a family-friendly organizational culture can also be instrumental for an individual's well-being (Thompson & Prottas, 2005; Wiese, 2004). Additionally, individuals themselves have responsibilities for their own work-family interplay and health outcomes. Consequently, they should actively seek social support,

regularly review their organization of demands of both domains, reduce aspiration levels and perfectionism, and find further possibilities of how they can master the challenges of work-family interplay successfully (Frone, 2003).

Moreover, the study shows how beneficial resilience is with regard to cortisol secretion and consequently its importance for health promotion. The challenge is that there are various definitions of resilience. Future research should define resilience more exactly and identify aspects of resilience which are developable beyond existing basic approaches (cf. American Psychological Association, 2012). For example, some definitions of resilience include the aspect that resilient people become even stronger than before when they have to overcome challenges (cf. Ryff, 1998). This aspect could be picked up practically through coaching in the face of actual or mastered problematic situations. As a result of such a coaching, individuals should learn to identify their own resources such as helpful behaviors or thoughts. In addition, new ideas about which other aspects would be helpful in similar situations could be collected. After a successful coaching, individuals then could use their strategies in the next challenging situation more effectively, and stress experiences might well be reduced. In the work-family domain, this could, for example, be implemented by maternity coaching for top-talented women who face the challenge of career-development and pregnancy at the same time. For the organization this would be beneficial, because it ensures that high-achieving women return to the organization more quickly from parental leave. For the women's resilience this would be advantageous, because further development in work hierarchies, *inter alia*, improves resilience (Ryff, 1998).

In summary, according to the presented study, organizations and individuals really should care about work-family integration. The results emphasize the importance of WFC and resilience even for the objective health indicator cortisol, which is related to serious diseases. Hence, the integration of both stressors of the work-family domain and resilience into general health promotion activities should be seen as advisable.

## 6. Overall Discussion

At the end of this dissertation this chapter firstly presents a summarization of the findings of this dissertation and the answers to the research questions (*Chapter 6.1*). Secondly, the main contributions to existing literature will be given (*Chapter 6.2*). Thirdly, in the following section about theoretical limitations and avenues for further research, the strengths and limitations of COR theory as overarching theory, the application of the developed comprehensive model as well as the results will be discussed. After that, empirical limitations and implications for further research will be described (*Chapter 6.3*). Then, implications for HR managers and experts that result from the dissertation's findings will be stated (*Chapter 6.4*). Finally, a conclusion will be drawn (*Chapter 6.5*). This is an overall discussion of the three studies. Study specific discussions are presented in chapters 3-5.

### 6.1 Summarization of Findings

The dissertation contributes to extant literature by the validation of a comprehensive model that involves deeper insights into the associations between personal and organizational antecedents, work-family interplay and employees' stress that is theory-based and practically relevant. Thereby, several research questions are answered as follows. Please note that the deeper discussion of findings is done in the following two sections theoretically as well as empirically.

Regarding *Research Question 1 (What influences do variables of a classic occupational health theory have in the context of WFC and stress?)*, Study I showed that, concerning the characteristics of the work situation according to the ERI theory, effort had no influence either on internal WFC or on irritation and only weak positive effects on external WFC. Also, reward had no significant association with irritation but reward was positively related to internal and negatively related to external WFC. However, the strongest impact was found with OC, which had, out of the three ERI-model variables, the strongest influences on internal as well as external WFC and irritation. The inspection of ERI-OC combination types showed that even the types where OC was highly pronounced had strongest impact on internal and external WFC as well as irritation. Additionally, it was found that OC also indirectly effected irritation by

WFC. Therefore, in sum, this dissertation contributes to existing literature by integrating a general mental health model into the work-family interface and answering Research Question 1 and showing that, from the classic variables of the ERI theory, first and foremost OC is crucial for the experiences of WFC and irritation.

Concerning *Research Question 2 (What are important resources for employed informal family caregivers when confronted with different types of WFC and stress?)*, Study II demonstrated that, with regard to irritation prevention, health-related self-efficacy had stronger impact on decreased irritation than work-family culture. Furthermore, internal WFC had greater impact on increased irritation than external WFC. Regarding prevention of internal as well as external WFC in a caregiver sample, work-family culture had stronger beneficial impact than health-related self-efficacy. Additionally, internal as well as external WFC and irritation are reciprocally related to each other. Moreover, work-family culture and self-related health had indirect influence on irritation by WFC. In sum, this dissertation therefore contributes to literature by investigating a family caregiver sample and answering Research Question 2 by proving that, regarding a family caregiver sample, work-family culture is an important organizational resource for the prevention of WFC and health-related self-efficacy is a crucial resource for the prevention of irritation.

*Research Question 3 (Do different types of WFC as well as work-family balance have an impact on a biomarker of stress such as cortisol?)* was answered by Study III, which showed that external WFC was positively related to cortisol secretion whereas, unexpectedly, internal WFC was negatively related to the mean cortisol level. Moreover, WFB was not associated with cortisol but was strongly predicted by resilience, which was even negatively related to cortisol. No mediation effects from resilience through work-family variables to cortisol were found. In sum, this study contributed to literature by using cortisol as an objective indicator and showing that WFC is related to this biomarker of stress.

A summary of all main results of the three studies is given in Table 7. With this overview the *overall aims* will be reached as follows. Regarding *Overall Aim 1 (Identification of personal and organizational antecedents that are important predictors regarding internal and external WFC and stress)*, it can be concluded that the most

important beneficial organizational antecedent for lower experiences of internal as well as external WFC is work-family culture. With regard to personal antecedents, the dissertation shows that OC is detrimental because of its internal and external WFC increasing effects. But on the other hand, regarding both types of WFC, health-related self-efficacy is beneficial. Moreover, resilience is a very strong predictor for WFB. With regard to stress consequences, the only significant predictor out of the characteristics of the workplace was work-family culture, having a slightly decreasing influence on irritation. Stronger impacts were found regarding personal characteristics: OC has a stress increasing effect, whereas resilience can decrease objective stress and health-related self-efficacy can decrease subjective stress. Regarding the work-family interface as predictors of stress, it was found that, first and foremost, internal WFC was irritation increasing and cortisol decreasing. In contrast, external WFC intensified irritation only in the caregiver sample of Study II. Moreover, external WFC increased even the cortisol level. To sum up these results, it can be concluded that WFC is a crucial predictor of stress and OC and work-family culture are the two key aspects that have impact on WFC.

Finally, the *Overall Aim 2 (Detection of differences in the association between different types of WFC and different stress indicators)* will be clarified. In sum, internal WFC seems to be stronger related to stress than external WFC. With regard to irritation, internal WFC has an obviously stronger association than external WFC. Concerning cortisol, while external WFC increased the mean cortisol level as expected, internal WFC decreased it. Therefore, this dissertation underlines that is insightful to differentiate between psychological as well as behavioral role involvements and also between subjective and objective stress indicators. Despite that, future research is needed, which will be described in the following section.



Table 7

*Summarization of the Main Dissertation's Findings*

Antecedents	Work-family interplay			Stress		
	<i>Internal WFC</i>	<i>External WFC</i>	<i>Work-family balance</i>	<i>Irritation</i>		<i>Cortisol</i>
	<i>Study I-III</i>	<i>Study I-III</i>	<i>Study III</i>	<i>Study I</i>	<i>Study II</i>	<i>Study III</i>
<i>Characteristics of work situation:</i>						
Effort	ns <sup>1</sup>	.13* <sup>1</sup>		ns		
Reward	.13** <sup>1</sup>	-.21** <sup>1</sup>		ns		
Work-family culture	-.44** <sup>2</sup>	-.48** <sup>2</sup>			-.12*	
<i>Characteristics of person(al)ity:</i>						
Overcommitment	.88** <sup>1</sup>	.31** <sup>1</sup>		.54**		
Health-related self-efficacy	-.17** <sup>2</sup>	-.25** <sup>2</sup>			-.30**	
Resilience	ns <sup>3</sup>	ns <sup>3</sup>	.57***			-.41*
<i>Work-family interplay:</i>						
Internal WFC				.35**	.44**	-.34*
External WFC				ns	.14**	.29*
Work-family balance						ns

*Note.* \*\* = .01 two-tailed. ns = not significant. <sup>1</sup> = Study I; <sup>2</sup> = Study II; <sup>3</sup> = Study III.

## 6.2 Contributions to Existing Research

### Theoretical Contributions and Strengths

In general, the COR theory has been chosen as the overarching theoretical framework for this dissertation, because (a) it is a wide-ranging theory that is appropriate for the development of a comprehensive model about employees' work-family interplay with stress, (b) different practically relevant variables could therefore be included with good theoretical argumentations, and (c) these variables could also be positively (resources) or negatively (resource consumers) defined. Moreover, it was most appropriate for the application to the work-family interplay, because (d) COR theory is domain unspecific, (e) interaction and compensation of resources beyond domains were mentioned and (f) the focus on resources is beneficial for theoretical as well as practical recommendations. Therefore, some important contributions to existing research and the strengths of this dissertation could be realized within this theoretical framework, which has been described along the seven points of the model development mentioned in Chapter 2.

With regard to the (1) *choice of antecedents*, the dissertation enlarged existing literature by the identification of important personal and organizational antecedents of employees' work-family and stress experiences: Firstly, the integration of the ERI theory - including overcommitment - in Study I was an important contribution to existing literature, because the three existing studies (cf. Franche et al., 2006; Kinman & Jones, 2008; Willis, O'Connor, & Smith, 2008) neglected overcommitment, which is indeed a crucial predictor of WFC as well as irritation. In contrast to overcommitment, effort and reward as well as their imbalance were less meaningful in this context. Moreover, overcommitment is practically relevant in times of a high career-orientation and high expectations by employers. Thus, this dissertation strengthens the importance of overcommitment as a resource-consuming variable and highlights similarities and differences of similar constructs such as irritation and internal WFC. Secondly, the results of Study II demonstrated the impact of work-family culture - here with an emphasis on eldercare-friendly culture - on the reduction of WFC. Thus, this dissertation approved work-family culture again as beneficial for the work-family interplay, but, beyond existing studies, it was shown that this result is also reliable with regard to employees with informal eldercare responsibilities. Thirdly, a new resource in

the context of WFC and irritation was defined, which has not been investigated in this context yet: health-related self-efficacy. Study II proved that this resource is beneficial for a reduction of irritation and also lowers WFC. Fourthly, Study III found that resilience, which is widely discussed but has not been theoretically or empirically integrated in a comprehensive model that predicts work-family interplay and stress, was beneficial for WFB and the mean cortisol level. These results deepen the insight that resilience should henceforth be integrated in the prospective theoretical assumptions more strongly.

In general, this dissertation related many antecedents to the work-family interface with regard to stress outcomes, which have rarely been investigated in this domain. Regarding the chosen antecedents, it is recognizable that characteristics of the work situation (reward and work-family culture) mainly have impact on the work-family interplay whereas characteristics of the person (OC, health-related self-efficacy and resilience) have strong impacts on work-family interplay as well as stress experiences. This seems to be plausible, because personal characteristics should have more influence on stress experiences and well-being in contrast to work characteristics, as personal characteristics determine how people evaluate different stressors. This approach consequently leads to the discussion of overall, domain unspecific resources, which will be picked up in the limitations section.

In sum, important antecedents were identified, which suggest essential starting points for workplace mental health promotion.

Moreover, the (2) *focus on WFC and WFB* highlighted specifications of these constructs that would not have become obvious if only one overall work-family variable was investigated. Thus, this procedure approved WFC as a key stressor that can have impact on subjective as well as objective stress indicators. Additionally, Study III showed, for the first time, that WFC was related to cortisol whereas WFB was not. Similarly, resilience had impact on WFB but not on WFC. These relationship patterns are in line with existing general assumptions about the matching principle in stress research (de Jonge & Dormann, 2006), and these results should therefore motivate further research whether there are positive (from positive antecedents or resources such as resilience over WFB to well-being) and negative (from negative antecedents or resource-consumers over WFC to stress) pathways. Moreover, in the studies which used

irritation as a dependent variable, the WFC experiences were mediators in the relationship between antecedents and stress-related consequences. This finding, together with the direct effects, highlights the importance of WFC as an objective for workplace health promotion.

As mentioned above, the *(3) differentiation between internal and external WFC* has rarely been made by existing literature (Carlson & Frone, 2003). This dissertation shows that it does make a difference which kind of role involvement is investigated, because this dissertation confirms that internal and external WFC have different antecedents and stress-related consequences. Internal WFC has the strongest impact on irritation and cortisol, but has an increasing effect on the subjective and a decreasing effect on the objective indicator. Psychological WFC, such as thinking in one domain about the other, increases irritation and rumination but, in the long run, leads either to problem solving or to changing the behavior or the situation and therefore decreases objective cortisol levels. In sum, this dissertation gains further insight into the differences between internal and external WFC, which highlights the importance of this differentiation for further research.

The operationalization of stress by the *(4) health-related consequence irritation* was chosen because irritation is a screening indicator of whether mental health promotion is necessary or not. This dissertation enlarges existing literature because there are only a handful of research findings on this relationship and very limited theoretical connections. As mentioned above, internal WFC, OC and irritation are strongly related with each other. In the discussion sections of Studies I and II, some conceptual overlap is discussed but also the distinct characteristics are carved out. Despite some overlap, this dissertation contributes to literature by showing the relevance of being too committed to work, which may result in, for example, feelings of not being able to stop thinking about work-problems at home and then, as a result, the stressful experience of goal-discrepancies, thus irritation. Therefore, in this dissertation, three constructs that are very important with regard to their interplay were brought together. What seems to be so clear and logical can have serious health-related consequences with regard to other irritation studies (cf. Mohr et al., 2005a). Moreover, in everyday life, many employees seem to be within such a process. Therefore, this interplay will be discussed further in the practical implications section.

This dissertation includes the, to the author's knowledge, first WFC-study that has investigated (5) *cortisol as a biomarker of stress*. Therefore, this dissertation has made the first important step towards a deeper understanding of the interplay between WFC and this objective indicator. Indeed, internal and external WFC were related to the mean cortisol level, which highlights the relevance of WFC for the employees' stress. The positive effect of external WFC and the negative impact of internal WFC showed that the relationship between WFC and cortisol is worth to be investigated further with the aim of validating these results and gaining further insights.

As mentioned above, the investigation of the (6) *direct effects of the antecedents on stress* in this dissertation was very insightful as it highlighted the relevance of the antecedents not only by their mediation paths but additionally in the direct manner. Despite that, according to COR theory's critics, a controversial point is that the experience of loss but maybe also the perception of resource gain are potentially influenced by core personality traits such as negative affectivity. Therefore, every investigated variable strictly has to be controlled for the impact of core personality traits. In this dissertation the focus consciously was on the direct impact of a person's characteristics, because the chosen variables have not been intensively investigated regarding work-family interplay and stress in existing research. Therefore, as an establishment of these variables and in order to enlarge existing literature, this approach of direct pathways is primarily necessary. Due to this approach, the results showed that especially the characteristics of the person such as overcommitment, health-related self-efficacy and resilience had strong impact on the individuals' stress.

Moreover, this dissertation contributes to existing research, because it validates the impact of (7) *reciprocal effects* between internal and external WFC and irritation. The results of Study II indicated that such reciprocal effects should be considered in theoretical frameworks about work-family interplay and stress. Beyond existing research, the results showed that internal WFC was more strongly related to irritation than vice versa and that irritation was more strongly related to external WFC than vice versa. This could be a hint to a causal pattern, which should be further investigated by means of longitudinal studies.

In sum, it can be concluded that the dissertation's research model was very appropriate and enlarged existing literature by (1) highlighting the importance of WFC

in the stress process, (2) showing that, in contrast to other variables, work-family culture and OC are crucial in the WFC-stress process, and (3) emphasizing that health-related self-efficacy and resilience are important resources regarding stress. Thus, a theory- and evidence-based model was developed that can be used for workplace health promotion which aims at an improvement of the work-family interplay as well.

### **Methodological Contributions and Strengths**

Firstly, all three studies analyzed overall models which included variables of antecedents, work-family interplay and stress outcomes. In each study, this model showed a good model fit; therefore, this basic model was validated. Moreover, this procedure made it possible to investigate the antecedents' relative contribution to this framework in relation to the other variables. Secondly, this dissertation includes very specific samples, such as the relatively large sample of employees with informal family responsibilities from one company, and very heterogeneous samples from different companies. Thirdly, with irritation as dependent variable in Study I and Study II, an instrument was chosen on the basis of norm scores. The results showed, as expected, that the caregiver sample had higher irritation scores than the norm population. Fourthly, despite the use of cross-sectional data in Study II, reciprocal effects were investigated that proved the reciprocal relationship between WFC and irritation. Fifthly, cortisol as a biomarker of stress is very new in the work-family research; Study III therefore makes an important methodological contribution to this research area.

## **6.3 Limitations and Avenues for Further Research**

### **Theoretical Limitations and Avenues for Further Research**

As usual, recent literature (cf. Hobfoll, 2001) has criticized some limitations of the COR model, which will be described in the following along the points of the model development and thus, in a similar structure as in the theory section.

Regarding the *(1) choice of antecedents*, a critical point is the definition and choice of resources of COR theory. Concerning this matter, two aspects are relevant: the broad definition of what a resource is and the existence of overall resources. The broad definition is beneficial on the one hand, because it does not exclude anything positive from acting as a resource, which is important as some resources are more beneficial for

certain kinds of people or situations than others. But, on the other hand, nearly everything could be defined as a resource and it is not clearly defined whether the absence of a resource-consuming condition, personal characteristic or object is already a resource. As far as the resource-consuming aspects of this dissertation – demands and OC – are concerned, this does not seem to be the case. The opposites of these constructs – no demands and no commitment – are not able to function in a resourceful manner. Rather, an individually appropriate level of these aspects seems to be determining regarding work-family or stress reactions. Nevertheless, Grandey and Cropanzano (1999) made a first step towards the identification of resources which are valid for a majority of individuals. According to the results of this dissertation, work-family culture is an important variable for many people for the reduction of WFC. In contrast, overcommitment is a strong resource-consumer with detrimental effects on WFC and irritation, whereas, health-related self-efficacy and resilience are important resources for many people and have the potential to act as overall resources. Therefore, future research should further identify the incremental validity with regard to similar constructs such as hardiness (Kobasa, 1979; Kobasa, Maddi, & Kahn, 1982), sense of coherence (Antonovsky, 1979, Antonovsky, 1987) and general self-efficacy (Bandura, 1977; Jex et al., 2001).

As mentioned above, beyond the (2) *focus on WFC and WFB* it also seems to be interesting to integrate *family-work conflict as well as facilitation* in a fuller model in order to investigate which resources could lower FWC and increase facilitation as well as the impact these aspects of the work-family interplay have on irritation and cortisol. WFB was included in the dissertation's model in order to examine whether there are different relationship patterns between conflict and the overall concept of balance. And indeed it seems to be the case that exclusively WFB - and not WFC - is positively affected by resilience. Therefore, it would be interesting to see whether resilience has impact on facilitation in a greater sample as well and is therefore mainly suited to influence positive rather than negative work-family experiences.

With regard to the (3) *differentiation between internal and external WFC* there is still a lack of conceptual distinction from e.g. the definition of strain-based, time-based and behavior-based WFC by Greenhaus and Beutell (1985). Therefore, a more consistent understanding of the different subscales of WFC should be developed.

As mentioned above regarding the relationship between the (4) *health-related consequence irritation* and work-family interplay, there is one disputed argument about the possibility that there may be, theoretically as well as empirically, a health-impairing path from negative aspects of the work-family interplay to mental ill-health and a motivational pathway from positive aspects of the work-family interplay to mental health as stated in the literature about the dual valence theory of emotions (Reich & Zautra, 1983; Vinokur & Selzer, 1975). Similar theoretical assumptions have been made in the model of work engagement and burnout, in which, on the one hand, a health-decreasing process increases burnout and, on the other hand, a motivational process increases work engagement (cf. Bakker & Leiter, 2010; Hakanen & Roodt, 2010). This two-way inspection could lead to further insights into whether the relationships between positive as well as negative aspects of the work-family interplay are similar with regard to different mental health indicators or whether these relationships follow two different pathways.

Additionally, according to COR theory, “loss’s impact is deeply cognitively rooted” (Hobfoll, 2001, p. 344) and loss should therefore have greater impact on cognitive irritation whereas resources may follow either a positive motivational process or have stronger impact on emotional irritation. Therefore, additionally to the differentiation between emotional and cognitive irritation, it would be necessary to include positive indicators of mental health or well-being in future research.

Regarding (5) *cortisol as a biomarker of stress* several suggestions for improvement concerning the methodological approach will be provided in the next section about empirical limitations. Due to these methodological limitations, these study results should rather be seen as hints than as the ultimate truth. With regard to the theoretical underpinning, one general critical aspect of the COR theory is that resource loss and appraisal processes are not strictly distinguishable when such a stress experience is defined as a personal aspect. Thus, if and how much people experience resource loss is dependent on their cognitive evaluation, which is similar to the theory by Lazarus (1966). Contrary to that criticism, Hobfoll (2001) stated that appraisals are very proximal indicators of resource loss but not identical with it, because there are other sources of evaluation than the individual, such as the social evaluation by culture or the evaluation by objective indicators. This criticism was encountered by the inclusion of cortisol in Study III as an objective biomarker of stress, which should be



expanded in future research. Moreover, in this dissertation it would have been interesting to investigate what the statistical relationship between irritation and cortisol would have been like.

Beyond the (6) *direct effects of the antecedents on stress* anyway, future research should also integrate moderating effects of important variables such as negative affectivity into the investigated relationships of this dissertation. Moreover, in the work-family domain, gender is another important variable that can function as a moderator. Existing research found divergent results about gender as a moderator in the WFC-stress process; therefore, future research is needed.

As a last point, it would be interesting to see whether there are also (7) *reciprocal effects* between demands, resources and experiences of WFC and irritation. This would further enlarge literature because, in the sense of COR theory, *proactive coping* is crucial in the stress process (cf. Hobfoll, 2001). Thus, according to the COR theory, if people are confronted with resource loss, a motivational process with the aim of preventing loss or gaining new resources starts. Therefore, with regard to WFC, on the one hand, it would also be possible that people who experience too many demands from work, which results in WFC, actively seek or build up resources like work-family culture, health-related self-efficacy or resilience. Furthermore, on the other hand, according to the loss spiral hypothesis, the relationship between work demands, WFC and irritation could also be reciprocal. For example, if someone experiences high WFC or high irritation, he/she has lowered resources and might therefore experience work demands as too high for his/her capacity. This is in accordance with the study results by Demerouti et al. (2004), who found, in a three-wave study, that there are reciprocal associations between work pressure, WFC and exhaustion. This is helpful for practical reasons because, with a deeper understanding of this interplay, individuals could be trained in the early detection of warning signs and maybe in faster reactions of prevention behaviors. The inclusion of proactive coping strategies would also be interesting as far as their functioning in these reciprocal relationships is concerned. Therefore, future research should identify which coping strategies are most appropriate for certain outcomes. For example, Ito and Brotheridge (2003) showed that the coping strategy of working harder increased emotional exhaustion whereas positive orientation decreased emotional exhaustion. Moreover, it should further be validated whether internal WFC indeed has short-time irritating effects and long-term cortisol decreasing

effects due to the mediating process of coping. To sum these points up, it is necessary to further investigate reciprocal effects, different time-delays as well as proactive coping mechanisms that function in this process.

### **Empirical Limitations and Avenues for Further Research**

Following the theoretical limitations, the empirical limitations and implications for further research will be discussed in the following.

Firstly, all three studies were based on cross-sectional data collections, which allow no causal conclusions within the studies' results. This is a general challenge for work-family research because most of the studies in this domain are of cross-sectional nature (Greenhaus et al., 2006). Therefore, strictly speaking, the overall model has to be further validated by longitudinal research designs for the investigation of reciprocal effects. Study II found reciprocal effects, which is in accordance with other studies (Demerouti et al., 2004), but this research area is still underdeveloped. Thus, because existing research cannot make accurate predictions about time delays in such a work-family interplay process, different short-term as well as long-term time lags should be considered. Therefore, an avenue for future research is to investigate different reciprocal effects by means of different time-delays within the proposed model. This would generate more insights into the dynamic processes, as discussed in the theory section. Therefore, future research should include at least two measurement points, at best even more than that (Greenhaus & Allen, 2011). In the case of cortisol measurement it would be best to have at least four saliva samples of two successive days as measurement points (Rösler et al., 2010).

Secondly, with exception of the cortisol measure, all data stemmed from the same self-report sources. Therefore, it cannot be ruled out that data are influenced by social desirability tendencies (cf. King & Bruner, 2000), such as that everyone might believe that it is socially not allowed to have (no) stress or that everyone is naturally very resilient. Therefore, social desirability tendencies should be controlled in further research.

Thirdly, common method bias (Gefen et al., 2011; Podsakoff et al., 2003) could be important due to the same data source. For Studies I and II, Harman's one-factor test

was applied and this procedure resulted in several factors rather than a general factor, indicating that common method bias was not obvious. In Study III, an additional source - cortisol from saliva - was used and the threat of common method bias was thereby lowered. Nevertheless, future research should integrate more sources of data such as partner ratings or other physiological indicators in order to validate the results of the dissertation. Therefore, also mixed-method approaches would be helpful. For example, for a deeper understanding of work-family culture or OC, interviews and daily diary reports could be insightful. Daily diaries, for instance, have the advantage that participants can record important thoughts or feelings at the very moment they experience them, and that they allow the observation of dynamic processes (Westman, 2002).

Fourthly, beyond linear relationships, which were assumed to be valid in this dissertation, there is a practical and theoretical need for a more non-linear analysis. According to the theoretical discussion about the choice of antecedents, the broad definition of resources was criticized, indicating the question of whether each variable can potentially be a resource depending on where it is located on a dimension continuum. Thus, is the absence of OC a resource? Or is it possible that some resources are too much and therefore not beneficial? Therefore, future research on resources as well as work-family interplay and stress should try to identify the right extent of work as well as personal antecedents with regard to the most beneficial outcomes. As a result, future research should include non-linear relationships such as an inverted u-curve for deeper insights. This would also answer the question of whether some resources can be too much, such as overmuch social support can also have impairing effects. For example, too much social support can lead to more strongly activated social roles and responsibilities, the feeling of having to pay many things back or even the feeling of an evolving dependence on social support and not being competent in one's own skills. This seems to be the same challenge with resources of the work situation. For example, Ito and Brotheridge (2003) found that task complexity, which was defined by them as a resource, was beneficial for several coping strategies such as working harder, advice and assistance but was also positively related to exhaustion. With regard to the dissertation's variables it can be asked whether work-family culture can be too much, so

that it is seen as normal and natural and thus has lower beneficial effects on the employees' stress levels.

Fifthly, as described in the sections about direct and indirect effects, the potential moderators of the dissertation's findings, such as core personality traits like negative affectivity, should be controlled. Moreover, potential moderating effects by gender could be analyzed (cf. Duxbury & Higgins, 1991; Frone, Russell, & Barnes, 1996). This analysis could identify whether men and women need different resources for the prevention of WFC and stress, or whether WFC has other impacts on stress in dependence of the gender. Furthermore, another potential moderator of existing research findings is the type of care someone is responsible for, such as having children, caring for adults with disabilities, caring for elderly people as well as having multiple caregiving roles (cf. Neal et al., 1993).

Finally, all samples were gathered in Germany. Moreover, despite the fact that Study I included a very heterogeneous sample, Study II concentrated on employed family caregivers and Study II focused on employed parents of young children. Thus, the study results cannot be generalized for all employees and other cultures. Most work-family research stems from American, European or Anglo cultures, to which the current results cannot simply be transferred (Lero & Lewis, 2008). Each country has a different culture, family political, organizational as well as societal frameworks, in which the work-family interplay takes place and therefore, different results have been found regarding the work-family interplay (Greenhaus & Allen, 2011; Heyman, 2009; Hofstede, 2001; Lero & Lewis, 2008; Spector et al., 2005). For example, Spector et al. (2005) found different correlations between work-family pressure and mental well-being in Romania ( $r = .03, p > .05$ ), Hong Kong ( $r = -.14, p < .05$ ), US ( $r = -.24, p < .05$ ) and Australia ( $r = -.47, p < .05$ ). Therefore, the dissertation's research findings cannot be generalized beyond the German culture and should be validated by international research.

## **6.4 Implications for HR Practitioners and Managers**

The investigation of the dissertation's comprehensive model indicated the following important recommendations for HR practitioners and managers.

Firstly, results showed that WFC and stress are strongly interconnected with each other. It cannot be advised to start either with WFC prevention or with stress prevention because according to the dissertation's results, both experiences are starting points for interventions. Therefore, activities in an organization regarding work health promotion and work-life balance should be synchronized to improve both WFC and stress at best.

Secondly, results showed that, regarding subjective stress experiences, psychological role conflicts and the insufficient ability to internally disconnect from work are particularly stressful. Thus, interventions should not only focus on medical-oriented workplace health promotions but also take psychological processes into account. Moreover, such preventions should include behavioral-based interventions such as time management but, in accordance to the research results of this dissertation, also internal cognitive patterns should be considered.

Thirdly, according to Westman et al. (2005), in general organizations should aim at "decreasing demands/losses and increasing resources/gains in one domain [to] may leave more resources available for the other domain, thus reducing conflict prospects" (p. 188). Because COR theory includes an environmental and an individual perspective, this theory in combination with the results of this dissertation give advice for situational as well as personal interventions, respectively. Moreover, in accordance with the COR theory, HR practitioners should focus on objective circumstances of the workplace rather than blaming individuals for their impaired health (Hobfoll, 2001). This dissertation makes this advice more concrete by showing that the work characteristic of work-family culture is an important point of situational WFC prevention in organizations. Therefore, resources can be built up by (1) improving managerial support, (2) maintenance of career options for employees who actively live their family responsibilities and (3) offering a family-friendly working-time culture. Because the culture in an organization is strongly built top down, management behavior is crucial for a work-family culture. Therefore, this aspect of work-family culture will be considered now in more detail. Thus, regarding the first aspect of work-family culture, it is crucial to train executives and HR practitioners beyond relevant legal aspects. Additionally, they should be trained in understanding behavior regarding work-family topics. For example, sensitization-workshops could help to improve family-friendly management behavior. With regard to employees with family caregiver responsibilities,

such a workshop could be based, for example, on the concept of reflection course of the BMW Group for general leadership behavior development (see Hoffmann & Jäckel, 2011). Translating and adapting this procedure to the work-caregiver domain, the modules could be structured as follows: (1) Introduction by a film that makes the challenge of combining work and caregiving responsibilities obvious, (2) What would the combination of work and caregiving roles mean for me personally? (3) Changes that can pull the rug out from under our feet: How important is security/stability/reliability (of leadership)? (4) Examples of actual organizational practice: How do we manage this work-family challenge in our company today? What are best practices outside our company? (5) What meaning has the engagement in work-family integration and leadership with regard to the organizational vision? (6) Which aspects of our leadership guidelines are behaviorally realizable by family-friendly leadership behavior? (7) How do we therefore bring live into our management concept? (8) What will we focus on more in the future regarding work-family aims for leadership behavior? (9) What findings do we get out of this workshop and how can they be transferred successfully? (10) Development of an action plan and feedback. During this procedure, leaders should learn what this topic means for themselves and others, how management guidelines can be realized by specific employee needs, and the exchange between leaders should contribute to a common understanding of the management principles and commit them to work-family management aims.

Moreover, the focus on this culture dimensions is especially important because the organizational culture also defines what is expected of men and women in this organization regarding their work but also family roles – including what is expected of leaders with familiar responsibilities. Last but not least everyone is part of the organizational culture and has to ask him-/herself if he/she acts family-friendly in the daily routine.

Fourthly, while organizations have no influence on the stable personality traits of their employees, they do have, to some degree, impact on which behavioral patterns are rewarded by the organization and its culture as well as whether offers for personal development are made. Thus, regarding the characteristics of a person that were considered in this dissertation, Berg et al. (2003) showed that there are high-commitment work environments that, in consequences of the dissertation's findings, are

not beneficial for WFC and health. Therefore, organizations should reflect on how beneficial commitment and work engagement really are for organizational success and what, for example, is the point of people sitting in their bureaus long hours but making more mistakes than working effectively and thereby also neglecting their family responsibilities and impairing their own health in the worst case. Rather they should reward if people actively set limits to their commitment, seek relaxation and renewal of their resources and come back to work dedicatedly. Another important aspect is the responsible handling of new technologies and the knowledge about in how far these are, on the hand, beneficial for the reduction of WFC and stress, such as having the ability to use flexible office arrangements to some degree, and what, on the other hand, is the point of letting these technologies determine our lives stronger than our intellect and the feeling of exhaustion. This is one of the real challenges of the workforce, but, with the aim to stay healthy as individuals as well as companies, the view has to be changed from fast successes to being successful in the long run. Therefore, first and foremost the highest management level of the organization is in responsibility. This is in accordance with COR theory and therefore, on an organizational level, if there are situations in which only short successes are needed for the health of a company, then the system is already sick and the employees' illness will follow quickly. Moreover, the employees have the responsibility to care for themselves. Thus, at an early stage, they have to learn that it is important to build up resources in order to prevent loss cycles and therefore, care for their own health.

Therefore, fifthly, it will be discussed how to build up personal resources that turned out to be beneficial in this dissertation. The consideration of the health specific concept of self-efficacy is very important for the deduction of recommendations for practice, because existing research showed that specific interventions such as activities in personnel development are more successful in the improvement of specific outcomes than rather general interventions (cf. Freedy & Hobfoll, 1994; Hobfoll, Jackson, Lavin, Britton, & Shepard, 1994). Thus, trainings in self-efficacy may be generally beneficial, but for the improvement of the employees' health status training in health-related self-efficacy seems to be more appropriate. Due to this dissertation it was proved that this specific concept has impact on irritation in a family caregiver sample, which could be an anchor point for intervention activities. There is no such specific training today. In

the conceptual design it should be considered that health-related self-efficacy might not be developed by a one-day training. Rather, follow-up modules are necessary. Such a training should be evaluated regarding short-time improvement of irritation and long-term improvement of cortisol level.

With regard to resilience, which was important in this dissertation for the experience of WFB and the cortisol level, a concept was investigated which seems to be a very promising resource. Therefore, despite conceptual clearness, there is more and more literature about resilience (Siebert, 2005; Wellensiek, 2011) but most research findings concentrated on children (cf. Masten, 2012; Seligman, 2007). Therefore, existing resilience trainings should be evaluated regarding their potential of increasing WFB and decreasing cortisol levels. Finally, HR practitioners should carefully choose an evidence-based and evaluated training concept.

Sixthly, WFB, which is strongly negatively related to internal WFC, could be enhanced. For the success of the practical implementation of WFB, it is especially important to concentrate on and enjoy the actual role someone has in a particular moment (Carlson et al., 2009a). That is more effective for a balanced feeling than prioritizing or restricting the number of roles, because these strategies alone do not prevent a person from thinking about one role while engaging in another one. Therefore, the key aspect to experience balance is to focus on and be attentive to one's prevailing role.

Moreover, as mentioned in the theory section about WFB, in the successful work-family interplay it is all about expectations. Expectations have to be defined and communicated by all participants of this interface, such as the individual, his or her family-members and crucial people from the workforce. If all parties know for themselves what they expect from their self-concept, from their family and from employees, they can communicate about their ideas and clarify whether these expectations are realistic and compatible. Only then individuals have the chance to concentrate on actual roles and experience a healthy WFB. For example, if someone knows that his or her employer does not expect working from home at the weekend, the employee does not have to have a guilty conscience that he or she exclusively cared for family members and checked no mails concerning work at the weekend. Through this conscious handling of expectations, individuals get a better feeling of roles or role



suggestions they get from others. However, they themselves have an active impact on the definition of their own roles as well. Thus individuals can take but also make their roles (cf. Grzywacz & Carlson, 2007; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). This view opens space for development and training of WFB in employees. Particularly important is the management of explicit and implicit expectations by individuals and human resources experts (Grzywacz & Carlson, 2007). Therefore, it is also insightful to question where the expectations come from, like the pictures everyone has in mind when thinking about WFB (cf. Halpern & Murphy, 2005). If people have and hold on to over-idealized pictures that are based on prevalent paragon, such as the idea of a perfectly healthy, mostly happy family, including highly intelligent and beautiful children and two partners, who also have successful careers, their own fulfilling hobbies, an affectionate partnership and a lot of material things like a house, cars and many more, then WFB will be doomed to failure. Therefore, it is important to built up realistic ideas about how successful people manage their lives and where they make restrictions in some domains. Thus, more realistic work-family role models, which speak about their successes and failures truthfully, are needed.

To sum up, this dissertation shows multiple starting points for better work-family interplay and lower stress. However, in the end, everyone has to become active to create a framework within which the work-family interplay is prone to be successful.

## 6.5 Conclusion

Work-family conflict is described as a key stressor in the existing literature. Therefore, this dissertation has explicitly examined the work-family interplay and its relevance in the stress process. Thus, the special merit of this dissertation is that it expands the existing work-family literature in consideration of a classic mental health model, a sample with a special work-family challenge and a physiological stress indicator. Consequently, this dissertation highlights the relevance of work-family interplay in the context of (1) ERI theory as a classic mental health model, (2) the sample of employees with informal caregiving responsibilities as well as (3) cortisol as a biomarker of stress. Due to this approach, a theory- and evidence-based model was developed that has practical relevance for workplace health promotion. With regard to the introduction, the results showed that in sum, individual as well as organizational attention should be paid to the improvement of resources such as work-family culture, health-related self-efficacy and resilience. Moreover, OC was identified as a crucial resource-consuming antecedent in this interface and should therefore be brought into the individual's as well as the organization's focus. Finally, every individual and every organization have to decide for themselves whether they want to stop for a moment and pay attention to the work-family interplay. If they are willing to actively create their work-family interplay, this dissertation offers insights into the first important question of where to start.

## 7. References

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## Appendix

### Appendix A: Instruments Applied in Study I to Study III

Construct	Instrument	Original Publication	Source of the German Version	Number of items	Study I	Study II	Study III
<i>Antecedents...</i>							
<i>...of the work situation</i>							
Effort	ERI-questionnaire short form	Siegrist et al. (2009)	<a href="http://www.uni-duesseldorf.de/medicalsociology/effort-reward_imbalance_at_wor.112.0.html#132">http://www.uni-duesseldorf.de/medicalsociology/effort-reward_imbalance_at_wor.112.0.html#132</a>	3	x		
Reward	ERI-questionnaire short form	Siegrist et al. (2009)	<a href="http://www.uni-duesseldorf.de/medicalsociology/effort-reward_imbalance_at_wor.112.0.html#132">http://www.uni-duesseldorf.de/medicalsociology/effort-reward_imbalance_at_wor.112.0.html#132</a>	7	x		
Work-family culture	Work-family culture scale	Thompson et al. (1999)	Wiese (2004)	14		x	
<i>...of the person(ality)</i>							
Overcommitment	ERI-questionnaire short form	Siegrist et al. (2009)	<a href="http://www.uni-duesseldorf.de/medicalsociology/effort-reward_imbalance_at_wor.112.0.html#132">http://www.uni-duesseldorf.de/medicalsociology/effort-reward_imbalance_at_wor.112.0.html#132</a>	6	x		
Health-related self-efficacy	Health-related self-efficacy Scale	Wieland & Hammes (2010)	See original publication	10		x	
Resilience	Resilience-Scale (RS-11)	Schumacher et al. (2005)	<a href="http://medpsy.uniklinikum-leipzig.de/medpsy.site,postext,testverfahren.html?PHPSESSID=n6rif8enkcp33hdj3min4umef4">http://medpsy.uniklinikum-leipzig.de/medpsy.site,postext,testverfahren.html?PHPSESSID=n6rif8enkcp33hdj3min4umef4</a>	11			x

**Instruments Applied in Study I to Study III (continued)**

Construct	Instrument	Original Publication	Source of the German Version	Number of items	Study I	Study II	Study III
<i>Work-Family Interplay</i>							
Work-Family Conflict	WFC Scale	Carlson and Frone (2003)	Translation given by Wiese via personal communication	6	x	x	x
Work-Family Balance	Work-Family Balance Scale	Carlson, Grzywacz, and Zivnuska (2009)	Own translation see Appendix A	6			x
<i>Stress</i>							
Irritation	Irritation Scale	Mohr et al. (2005)	See original publication	8	x	x	
Cortisol	Salvia Samples	-	See Appendix B	-			x

### Translation of the Work-Family Balance Scale Applied in Study III

(translated from the work–family balance measure by Carlson et al., 2009a)

Kreuzen Sie bitte bei jeder Frage die für Sie am besten zutreffende Antwort an.

	Stimme gar nicht zu				Stimme sehr zu
Ich bin in der Lage, berufliche und familiäre Erwartungen zu erfüllen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ich erfülle die Rollenerwartungen von wichtigen Menschen in meinem Arbeits- und Privatleben.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Menschen, die mich näher kennen, würden sagen, dass ich Arbeit und Familie gut vereinbare.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ich bin in der Lage, die Erwartungen, die meine Vorgesetzten und meine Familie an mich stellen, zu erfüllen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meine Kollegen und meine Familienmitglieder würden sagen, dass ich ihre Erwartungen erfülle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aufgrund des Feedbacks meiner Kollegen und meiner Familie weiß ich, dass ich sowohl der Verantwortung gegenüber meiner Arbeit als auch gegenüber meiner Familie nachkomme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## **Appendix B: Appendix to Study III**

### **Befragung zum Thema Vereinbarkeit von Familie und Beruf**

Vielen Dank für die Teilnahme an dieser Befragung! In diesem Fragebogen geht es um Ihre persönliche Meinung. Daher gibt es keine "richtigen" oder "falschen" Antworten! Bitte lesen Sie die Fragen sorgfältig durch und antworten Sie spontan. Der erste Eindruck, das erste Gefühl, trifft meistens auch zu.

Ihre Angaben werden im Rahmen eines Forschungsprojektes der TU Dortmund anonym und ausschließlich zu wissenschaftlichen Zwecken ausgewertet.

Bitte geben Sie hier Ihren *persönlichen Code* an. Damit können wir später Ihre Speichelprobe dem Fragebogen zuordnen und Ihre Anonymität bleibt gesichert. Zur Erinnerung: Der persönliche Code sollte aus (1) dem Anfangsbuchstaben des Vornamens Ihrer Mutter, (2) dem zweiten Buchstaben des Vornamens Ihres Vaters, (3) dem Anfangsbuchstaben des Monats, in dem Sie geboren sind, (4) dem letzten Buchstaben Ihres Geburtsortes sowie (5) Ihrer aktuellen Hausnummer bestehen. Mein persönlicher Code \_\_\_\_\_



Bitte beginnen Sie nun mit dem Ausfüllen der folgenden Fragen. Zu Beginn benötigen wir einige Angaben zu Ihrer Person. *Zur Erinnerung: Alle Daten werden streng vertraulich behandelt und dienen ausschließlich Forschungszwecken.*

Heutiges Datum (Datum des Ausfüllens, z.B. 21.03.2011): \_\_\_\_\_

Geben Sie bitte Ihr Alter an: \_\_\_\_\_ Jahre

Ihr höchster Bildungsabschluss:

Hauptschule     Realschule     Gymnasium     Hochschule

Sind Sie erwerbstätig?     Nein     Ja

Wie würden Sie Ihren beruflichen Status beschreiben?

Studierender     Praktikant     Auszubildender     Angestellter  
 Beamter     Selbstständiger     Nicht-Erwerbstätiger

Bitte geben Sie die Arbeitszeit Ihrer Erwerbstätigkeit an:

Vollzeit (über 35 Std.)     Teilzeit (bis 35 Std.)     Geringfügig (bis 15 Std.)

Wie viele Jahre Berufserfahrung haben Sie? (ohne die Zeit Ihrer Berufsausbildung)  
\_\_\_\_\_ Jahre

Haben Sie Personalverantwortung?     Nein     Ja

Bitte geben Sie Ihren Familienstand an.

ledig     (eheähnliche) Partnerschaft     verheiratet     geschieden     verwitwet

Wie viele Kinder unter 18 Jahren haben Sie?

keine Kinder     1 Kind     2 Kinder     3 Kinder     4 oder mehr Kinder

Wenn Sie Kinder haben, wie alt sind Ihre Kinder? (Mehrfachantworten sind möglich)

unter 3 Jahre     3 bis 6 Jahre     6 bis 12 Jahre     über 12 Jahre

Haben Sie pflegebedürftige Angehörige?

Nein.  
 Ja, ich habe pflegebedürftige Angehörige, die **nicht** in meinem Haushalt leben.  
 Ja, ich habe pflegebedürftige Angehörige, die in meinem Haushalt leben.

Wenn Sie einen pflegebedürftigen Angehörigen haben, welche Pflegestufe hat dieser?

Pflegestufe I     Pflegestufe II     Pflegestufe III     Bisher noch keine Pflegestufe

**Bitte geben Sie an wie viel Zeit Sie ungefähr pro Woche für Hausarbeit aufwenden:**  
\_\_\_\_\_ Stunden pro Woche

**Hatten Sie heute oder in den letzten Tagen ein oder mehrere sehr stressige oder belastende Ereignisse in Ihrem Leben?**  Nein  Ja

**Bitte geben Sie Ihr Geschlecht an:**  weiblich  männlich

**Bitte geben Sie Ihre Körpergröße an:** \_\_\_\_\_ cm

**Bitte geben Sie Ihr aktuelles Körpergewicht an:** \_\_\_\_\_ kg

**Rauchen Sie?**  Nein  Ja

**Falls Sie rauchen, geben Sie bitte die Anzahl von Zigaretten pro Tag an:** \_\_\_\_\_ Stück

**Bitte kreuzen Sie an, wenn eine der folgenden Erkrankungen bei Ihnen vorliegt:**

- Diabetes  Herz – Kreislauf - Beschwerden  
 Psychische Erkrankung  Rheuma  
 sonstige chronische Erkrankung

**Wenn Sie eine Frau sind, füllen Sie bitte folgende Fragen aus. Das ist wichtig, da die Verhütung und Menstruation einen Einfluss auf die Hormonextraktion haben. Wenn Sie ein Mann sind, fahren Sie bitte auf Seite 3 mit der Beantwortung der Fragen fort.**

**Geben Sie bitte an, ob und wenn ja, wie Sie hormonell verhüten.**

- Nein  Ja, mit der Antibabypille  Ja, mit der Minipille  
 Ja, mit einem Verhütungsring  Ja, mit einer Dreimonatsspritze  Ja, mit einem Hormonpflaster  
 Ja, mit einer Hormonspirale  Ja, mit einem Verhütungsstäbchen

**Geben Sie bitte an, wann der erste Tag Ihrer letzten Menstruation/ Periode war:**  
\_\_\_\_\_ (Datum, z.B. 21.03.2011)

**Haben Sie eine regelmäßige Periode?**  Nein  Ja

## **Vielen Dank für Ihre Teilnahme!**

Gerne bestätige ich Ihnen an dieser Stelle noch einmal, dass die erhobenen Daten streng vertraulich behandelt werden. Ich danke Ihnen herzlich für die Teilnahme und stehe Ihnen für Fragen und Anregungen gerne zur Verfügung.

### **Dipl.-Psych. Susanna Krisor**

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## Hinweise zur Entnahme der Speichelprobe

Vielen herzlichen Dank für Ihre Teilnahme an dieser Studie!

Füllen Sie bitte den Fragebogen vollständig aus. Entnehmen Sie **im Laufe eines Tages drei Speichelproben**. Anhand der Proben wird die Cortisolkonzentration bestimmt, welche in dieser Studie als Indikator für Belastungen erfasst wird. Ihre Daten werden im Rahmen eines Forschungsprojektes der TU Dortmund anonym und ausschließlich zu wissenschaftlichen Zwecken ausgewertet.

*Bitte gehen Sie gewissenhaft und sorgfältig bei der Entnahme der Speichelproben vor und beachten Sie genau die Anweisungen!*

### Handhabung der Salivette:

*Beschriften Sie das äußere Gefäß (Zentrifugengefäß) mit ihrem persönlichen Code (siehe Rückseite) und dem Entnahmezeitpunkt (z.B. 8.30 Uhr).*

*Lösen Sie den blauen Stopfen vom inneren Gefäß (Einhängegefäß) und entnehmen Sie die Watterolle. Kauen Sie nun für ca. 1 Minute die Watterolle bis die Watterolle möglichst vollständig eingespeichelt ist. Geben Sie die eingespeichelte Watterolle nun zurück in das Gefäß (Einhängegefäß) und verschließen es mit dem Stopfen. Die Salivette muss nun bis zum Abgabepunkt im Gefrierfach gelagert werden.*

- Sie sollten vor der Probeentnahme 30 Minuten nicht essen, trinken (v.a. keine Vitamin C-haltigen Getränke!), nicht rauchen, Kaugummi kauen oder Zähne putzen.
- Andernfalls spülen Sie bitte 5 Minuten vor der Probeentnahme den Mund gründlich mit kaltem Wasser.
- Die Speichelprobe sollte nicht bei Krankheiten, Entzündungen oder Verletzungen der Mundhöhle genommen werden, da in diesem Falle Blut in die Probe gelangen könnte.

Die erste Probe entnehmen Sie bitte **30 Minuten nach dem morgendlichen Aufwachen!**

Die zweite Probe entnehmen Sie bitte mittags **um 14 Uhr!**

Die dritte Probe entnehmen Sie bitte abends **kurz vor dem zu Bett gehen!**

Denken Sie bitte daran, alle Proben mit Ihrem *persönlichen Code* zu versehen, den Sie auch auf dem Fragebogen angegeben haben. Damit kann ich Ihre Speichelprobe Ihrem Fragebogen zuordnen und Ihre Anonymität bleibt gewahrt. Füllen Sie außerdem bitte zusätzlich das folgende Kurzprotokoll aus.

Nachdem Sie

- ✓ den Fragebogen inkl. persönlichem Code ausgefüllt haben,
- ✓ die Speichelproben entnommen haben,
- ✓ die Speichelproben mit persönlichem Code, Datum und Uhrzeit beschriftet haben und
- ✓ das Kurzprotokoll ausgefüllt haben,

schicken Sie bitte alle diese Unterlagen und Proben in dem beigefügten Rückumschlag an mich zurück.

**Ich danke Ihnen vielmals für Ihr Engagement!**

Dipl.-Psych. Susanna Krisor

## PERSÖNLICHER CODE

Um die Daten Ihres Fragebogens und Ihrer drei Salivetten zusammenzufügen, bitte ich Sie nun sich einen persönlichen - nur Ihnen bekannten - Code auszudenken. Dieser Code soll die anonyme Zuordnung der Fragebögen ermöglichen. Stellen Sie bitte sicher, dass der Code auf dem Fragebogen und den Salivetten identisch ist.

Bitte geben Sie in den Feldern unten einen persönlichen Code ein, den Sie auch auf jede Salivette schreiben. Ihnen persönlich werden aufgrund der Anonymität keinerlei Daten zugeordnet. Aus dem Code kann nicht auf Ihre Person zurückgeschlossen werden.

**1. Tragen Sie bitte den ersten Buchstaben des Vornamens Ihrer Mutter ein:**

Beispiel: Marianne

**2. Tragen Sie bitte den zweiten Buchstaben des Vornamens Ihres Vaters ein:**

Beispiel: Heinz

**3. Tragen Sie bitte den Anfangsbuchstaben des Monats, in dem Sie geboren sind, ein:**

Beispiel: April

**4. Tragen Sie bitte den letzten Buchstaben Ihres Geburtsortes ein:**

Beispiel: München

**5. Tragen Sie bitte Ihre aktuelle Hausnummer ein:**

Beispiel: Bornstr. 15

Der zu übertragende Gesamtcode lautet dementsprechend:

## KURZPROTOKOLL

Wann genau haben Sie die Speichelproben genommen?

*Die **erste Probe** entnehmen Sie bitte 30 Minuten nach dem morgendlichen Aufwachen!*

Datum: \_\_\_\_\_ Uhrzeit: \_\_\_\_\_

*Die **zweite Probe** entnehmen Sie bitte mittags um 14 Uhr!*

Datum: \_\_\_\_\_ Uhrzeit: \_\_\_\_\_

*Die **dritte Probe** entnehmen Sie bitte abends kurz vor dem zu Bett gehen!*

Datum: \_\_\_\_\_ Uhrzeit: \_\_\_\_\_

## **Appendix C: Declaration**

### **Eidesstattliche Versicherung und Erklärung (gemäß § 11 Absatz 2) der Promotionsordnung**

Hiermit erkläre ich an Eides statt, dass ich die Dissertation mit dem Titel:

*„Personal and Organizational Antecedents of Employees’ Stress:  
Differential Analyses of the Work-Family Interplay“*

selbständig und ohne fremde Hilfe verfasst habe.

Andere als die von mir angegebenen Quellen und Hilfsmittel habe ich nicht benutzt. Die den herangezogenen Werken wörtlich oder sinngemäß entnommenen Stellen sind als solche gekennzeichnet.

Hiermit erkläre ich, dass ich mich noch keiner Doktorprüfung unterzogen oder um Zulassung zu einer solchen beworben habe.

Die oben genannte Dissertation hat noch keiner Fachvertreterin, keinem Fachvertreter und keinem Prüfungsausschuss einer anderen Hochschule vorgelegen.

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Ort, Datum

Unterschrift