I learn therefore I apply?

Towards a better understanding of the way antecedents influence the transfer of training content to work practice

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CHAPTER 2
Predicting Transfer of Training Through the Unified Model of Task-Specific Motivation

Abstract
The aim of this study is to investigate the merits of the unified model of task-specific motivation (UMTM) in predicting transfer of training and to investigate (relationships between) changes in UMTM components over time. In doing so, this study takes the multidimensionality of transfer motivation into account. We collected data among 514 employees of the judiciary who filled in the UMTM questionnaire directly after the training and after three weeks. The data is analyzed by means of structural equation modelling. The outcomes show that transfer motivation predicts transfer intention and transfer of training over time. Moreover, the study shows that (change in) transfer motivation is predicted by (change in) personal and contextual antecedents identified by the UMTM as antecedents of motivation. This study describes the first longitudinal evaluation of the UMTM in the literature and shows its applicability for predicting transfer of training. Moreover, it also one of the few studies that investigates transfer motivation multidimensionally and how this relates to transfer of training. As such, this study informs other transfer of training models about the nature of transfer motivation and how transfer of training could be predicted.

Keywords: unified model of task-specific motivation, transfer of training, transfer motivation, transfer intention, predictive value
2.1. Introduction

Transfer of training, the application in the work environment of knowledge and skills that employees gained during training, is essential for employees and organizations to keep up with - and respond to - innovations and the fast-paced changes in today’s work (Grossman & Salas, 2011; Poell, 2017; Segers & Gegenfurtner, 2013). However, despite the large sums of money that organizations invest in training every year (Beer et al., 2016), transfer of training is limited (Botke et al., 2018).

Over the past decades, research has shown that transfer motivation is a pivotal predictor in determining transfer of training. Moreover, transfer motivation plays an essential role in explaining why other predictors like characteristics of employees, their work contexts, and training designs influence transfer of training (see Grossman & Salas, 2011; Jacot et al., 2015; Tonhäuser & Büker, 2016 for reviews).

Nevertheless, transfer motivation is often not conceptualized in accordance with current theories of motivation (Gegenfurtner, 2013; Gegenfurtner et al., 2009ab). Many studies approach transfer motivation as a one-dimensional construct. However, current motivational theories stress that motivation has multiple dimensions that uniquely determine behaviour (Deci & Ryan, 2000; Harackiewicz et al., 2002). Research has shown that qualitatively different types of motivation for transfer of training relate differently to transfer intentions and/or transfer of training (Gegenfurtner, 2013; Gegenfurtner et al., 2016). As such, much research to date on the effects and explanatory role of transfer motivation can be refined through employing motivational theory (Jacot et al., 2015). Conceptualizing transfer motivation in accordance with current motivational theory creates a challenge as there are many different theories of motivation (see Eccles and Wigfield, 2002 for a review).

To overcome this challenge, recently an effort has been made to combine multiple theories into a unified model of task-specific motivation (UMTM; De Brabander & Martens, 2014). In short, the UMTM does so by acknowledging that these theories all include cognitive and affective types of motivation that predict motivated behaviour. The model also identifies personal and contextual antecedents that predict these types of motivation and explains why they do so.
Researchers have started to test the UMTM in search of empirical evidence for its assumptions (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018). These studies showed that the collected data could be modelled adequately through the dynamics of the UMTM. However, the merits of the UMTM are not yet fully understood. Thus far, it is not tested whether the dynamics of the model also translate to the transfer of training context. Moreover, it is unclear whether the model can be used to predict actual task-specific action, including transfer of training. Finally, previous studies have relied on cross-sectional data, which precludes conclusions about how components of the model change over time, or how possible changes are related to each other. Therefore, the aim of this study is to investigate the tenability of the UMTM in predicting transfer of training and to investigate (relationships between) changes in UMTM components over time.

2.1.1. The Unified Model of Task-specific Motivation

The UMTM (see De Brabander & Martens, 2014 for an in-depth description of the UMTM) proposes motivational dynamics that predict task-specific action, of which transfer of training is an example. The UMTM integrates six theories of motivation, namely self-determination theory (Ryan & Deci, 2020), expectancy-value theory (Eccles & Wigfield, 2020), flow theory (Csikszentmihalyi, 1990), self-efficacy theory (Schunk & DiBenedetto, 2020), the person-object theory of interest (Krapp, 2002) and the theory of planned behaviour (Ajzen & Fishbein, 2008). The model’s main argument to do so is that these theories all include affective and cognitive types of motivation that are theorized to precede motivated behaviour.

Moreover, the UMTM integrates personal and contextual antecedents that are identified by several motivational theories to affect these affective and cognitive types of motivation. In addition to the overlap between motivational theories that the UMTM addresses, links between the UMTM and existing transfer of training models (e.g., Baldwin & Ford, 1988; Grossman & Salas, 2011; Holton, 1996; Massenberg et al., 2017) can be drawn. These existing models identify personal components (e.g., personal feelings of autonomy and perceived utility of a training), and contextual components (e.g., social norms and supervisor support) as antecedents of transfer motivation. These components are also part of the UMTM. In contrast to existing
transfer of training models, the UMTM hypothesizes about the complex interrelationships between these personal and contextual antecedents. As such, the UMTM can inform transfer of training models about interrelationships among antecedents included in them (see Figure 2.1. for an overview of the UMTM).

**Figure 2.1.**
The Unified Model of Task-specific Motivation (De Brabander and Martens 2014, Adapted by De Brabander and Glastra 2021).

De Brabander and Martens (2014) argue that two conceptually independent regulation systems, one affective and one cognitive, give rise to two types of motivational valences that energize and direct task-specific action (cf. Krapp, 2002). Within the transfer of training context, these two valences together would be conceptualized as transfer motivation. The affective valences are defined as appraisals of feelings that are aroused by an activity. Cognitive valences are the product of evaluation of action consequences. Cognitive valences can refer to the value of an action that individuals see for themselves, or for others. The UMTM therefore distinguishes between personal and non-personal cognitive valences.

Both valences can be positive or negative. Positive valences instigate individuals to approach actions in order to realize them, whereas negative valences
lead to avoidance behaviour (Elliot, 2006). In the context of transfer of training, seeing the gains in work efficiency that applying a learned skill would yield (for oneself or for others) is an example of a positive cognitive valence. A negative cognitive valence would be to expect a higher workload (for oneself or for others) as a consequence of applying new skills. A positive affective valence would entail feeling excited to practice a newly learned skill at work. Finally, feeling frustrated about having to apply such a skill would be an example of a negative affective valence. As displayed in Figure 2.1., it is theorized that all types of valences, can be relatively independent and, in interaction, are combined into an overall valence appraisal. This valence appraisal determines individuals’ willingness to execute an activity (i.e., readiness for action, of which transfer intention is an example) and, subsequently, action (De Brabander & Martens, 2014). These assumptions are in line with transfer of training literature that showed that different types of transfer motivation predict transfer intention (Gegenfurtner, 2013; Gegenfurtner & Quesada-Pallarès, 2022) and that transfer intention predicts transfer of training (Gegenfurtner, 2013; Gegenfurtner & Testers, 2022). Figure 2.2. provides an overview of the expected relationships between the valences, readiness for action and action.

**Figure 2.2.**

*Expected Relationships Between Affective and Cognitive Valences, Readiness for Action and Action.*
This leads to the following hypotheses:

**H1.** Positive affective and cognitive valences positively predict readiness for action.

**H2.** Negative affective and cognitive valences negatively predict readiness for action.

**H3.** Readiness for action positively predicts action.

The affective and cognitive valence types described by the UMTM differ from types of motivation distinguished in self-determination theory and expectancy-value theories. In self-determination theory (Ryan & Deci, 2020), the affective component is intrinsic motivation and the cognitive component is distinguished in different types of extrinsic motivation. Intrinsic and extrinsic motivation are fundamentally opposed, as more extrinsic motivation diminishes intrinsic motivation. In expectancy-value theories (Ajzen & Fishbein, 2008; Eccles & Wigfield, 2020), on the other hand, affective and cognitive components are considered different facets of value that sum up to a total value. The UMTM differs from these theories by conceptualising affective and cognitive valences as the resultant of different, conceptually independent systems of behaviour regulation (cf. Krapp, 2002), implying that both oppositional and additive relations can occur.

None of the motivational theories included in the UMTM scrutinize the distinction between approach and avoidance motivation. Ever since the inception of expectancy-value theory of achievement motivation, costs have been a facet of subjective value (cf. Eccles & Wigfield, 2020). Costs simply add up (negatively) to subjective value. The UMTM recognises costs as negative valences which generate avoidance motivation. The UMTM therefore identifies the run-up to and sustainment of every single activity fundamentally as an approach-avoidance conflict, also in cases where superficially no sign of conflict is apparent.

### 2.1.2. Task-specific Antecedents

In addition to the notion of valences, the UMTM also integrates motivational theories in terms of task-specific antecedents of these valences. The model distinguishes between three categories of personal and contextual antecedents in this respect. The first category refers to individuals’ appraisals of completing an action
successfully. Most theories of motivation (e.g., self-efficacy theory; Schunk & DiBenedetto, 2020) include some construct that represents individuals’ sense of personal competence to predict motivation. In the UMTM, sense of personal competence refers to the extent to which individuals perceive themselves as capable of enacting task-specific behaviour (e.g., am I able to apply the training content in practice?; De Brabander & Martens, 2014). In addition, De Brabander and Martens (2014) argue that individuals’ appraisals of prospective success depend on whether they perceive their context to be supportive of the action they are to perform. They would argue, for example, that it is impossible to expect someone to successfully apply a newly learned IT skill at work if the right technology to do so is not provided, regardless of one’s own sense of personal competence. This perceived external support, together with sense of personal competence results in a feasibility appraisal about performing a task successfully (De Brabander & Martens, 2014).

Based on self-determination theory (Deci & Ryan, 2000) indirect effects of feasibility appraisal on transfer intention are expected. These effects are also in line with transfer of training literature indicating that self-efficacy (i.e., sense of personal competence) is a predictor of transfer motivation (Massenberg et al., 2017). Moreover, support from the work floor (e.g., supervisory support and availability of necessary resources) has been found to be a predictor of transfer motivation (Massenberg et al., 2017; Salamon et al., 2022a). Based on the theory of planned behaviour (Ajzen & Fishbein, 2008) and expectancy-value theory of achievement motivation (Wigfield & Eccles, 2000; Eccles & Wigfield, 2020), possible direct effects are anticipated as well and such effects have been found in previous studies investigating the UMTM (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018), and also in the transfer of training literature for self-efficacy (Gegenfurtner & Testers, 2022). Figure 2.3. provides an overview of the expected relationships between sense of personal competence, perceived external support, feasibility appraisal and the valences.
This leads to the following hypotheses:

*H4.* Feasibility appraisal positively predicts positive affective and cognitive valences.

*H5.* Feasibility appraisal negatively predicts negative affective and cognitive valences.

The second category of antecedents concerns individuals’ autonomy. This category, too, distinguishes between a personal and a contextual facet. The personal facet is described by individuals’ sense of personal autonomy, which is defined as the extent to which people experience themselves to be the origin of choosing and performing an action scheme (e.g., experiencing volition to decide how and when training content is being applied). The contextual facet refers to perceived freedom of action, which is defined as the extent to which individuals experience freedom to make decisions about the selection and performance of an action scheme granted by their contexts (e.g., freedom to make choices in applying training content). In line with self-determination theory (Deci & Ryan, 2000), perceived freedom of action is hypothesized to contribute to individuals’ sense of personal autonomy, which in turn affects transfer intention through valence appraisals. Between sense of personal autonomy and affective valence, a reciprocal relationship is expected (De Brabander
Martens, 2014). These assumptions corroborate transfer of training literature that indicates that autonomy in applying training content is a positive predictor of transfer motivation (Colquitt, 2000). Empirical explorations of the UMTM showed that sense of personal autonomy was also directly related to transfer intention (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018; see Figure 2.4. for an overview of the expected relationships between perceived freedom of action, sense of personal autonomy and the valences).

**Figure 2.4.**


This leads to the following hypotheses:

- **H6.** Perceived freedom of action positively predicts sense of personal autonomy.
- **H7.** Sense of personal autonomy positively predicts positive cognitive valences.
- **H8.** Sense of personal autonomy negatively predicts negative cognitive valences.
- **H9.** Sense of personal autonomy has a positive reciprocal association with positive affective valence.
**H10.** Sense of personal autonomy has a negative reciprocal association with negative affective valence.

The final category of antecedents revolves around social components. In theory of planned behaviour, subjective norm is included as a social facet. It refers to the tendency to abide by the approval or disapproval of significant others regarding particular behaviours (e.g., negative reactions from colleagues when training content is being applied in practice; Ajzen & Fishbein, 2008). This tendency is theorized to depend on the extent to which people feel connected to others who participate in the context of an activity (i.e., sense of personal relatedness; Deci & Ryan, 2000). As feelings of relatedness with colleagues were not assumed to vary over instances of transferring training content, it was not considered a task-specific antecedent of transfer of training. As such, relatedness was not investigated in this study. In line with self-determination theory, subjective norm is hypothesized to have an indirect effect on transfer intention via cognitive and affective valences. In line with theory of planned behaviour, subjective norm is expected to have a possible direct effect on transfer intention as well (De Brabander & Martens, 2014). Empirically this effect could be confirmed but depended on the characteristics of the activity (De Brabander & Glastra, 2018; De Brabander & Martens, 2018). Moreover, within the transfer of training literature, Gilpin-Jackson and Bushe (2007) found that positive organizational norms towards applying training content enhances transfer of training. However, they did not investigate the effect of organizational norms on transfer motivation. Figure 2.5 provides an overview of the expected relationships between subjective norm, sense of personal relatedness and the valences.
This leads to the following hypotheses:

*H11.* Subjective norm positively predicts positive affective and cognitive valences.

*H12.* Subjective norm negatively predicts negative affective and cognitive valences.

Studies investigating the UMTM showed that data could be modelled in accordance with the UMTM when it was used to predict teachers’ intention to perform professional learning activities. However, whether and to what extent different UMTM components were related to each other, depended on the characteristics of the specific activity. Subjective norm, for instance, played a more pervasive role for activities that were more social in character (De Brabander & Glastra, 2018; De Brabander & Martens, 2018). Moreover, affective valences were more in balance with cognitive valences for personally decided activities, whereas for board and team decided activities cognitive valences dominated (De Brabander & Glastra, 2018). In all studies, sense of competence played a less prominent role than could be expected from motivational theory.

In the current formulation of the UMTM time of appraisal is not determined. People have appraisals of the components of the model before, during and after performance of an activity (De Brabander & Glastra, 2018). Time of appraisal does matter though, for instance because appraisals in advance will be more uncertain than
during or after an activity, but appraisals of the components of the model can be made at different points in time. However, previous studies investigating the UMTM have not investigated how these appraisals in the components of the model change over time and what impact this has for transfer motivation, transfer intention and transfer of training. In line with the assumed cross-sectional relationships between the UMTM components, it could be expected that changes among components over time are related to the other components of the UMTM. For example, if cross-sectional results show that feasibility appraisal positively predicts positive affective valence, it is expected that changes between these constructs are also related to each other. This leads to the following hypothesis:

H13. Changes in the UMTM components relate to each other in accordance with cross-sectional relationships.

2.1.3. The Present Study

To sum up, previous research did not investigate the extent to which the UMTM predicted actual task-specific action (of which transfer of training is an example), nor studied (relationships between) changes in UMTM components. Moreover, we expect that transfer of training can be explained and predicted through the dynamics of the UMTM. This leads to the following research questions:

1) To what extent do components of the UMTM predict transfer of training among employees?
2) How do UMTM components change after going through transfer opportunities and how are these changes related to each other?

2.2. Method

2.2.1. Sample and Procedure

Data were collected among employees of the Dutch justice system. These employees participated in training courses that were organized by the study centre for the judiciary. These courses ranged in aim from acquiring knowledge about the legislation of the European Union to learning to compose a well-written verdict. Most courses focused on providing knowledge (84.4%) whereas a minor proportion (15.6%) focused on providing skills. Courses were considered suitable for inclusion in this study if 1) they allowed for data collection during and directly after the course, 2) more
than ten participants were scheduled to attend, and 3) there was a substantial probability that participants would have opportunities to use the learned content in practice within three weeks after finalizing the course. One hundred and two courses were initially selected, with a total of 1410 prospective participants for this study. The length of the courses ranged between one day and six weeks. The amount of contact days during the course ranged between one and eight full days. All trainings were provided in-person. Course trainers asked participants to fill in digital questionnaires at two time points, once directly after the course and once three weeks later. The time between data collections was set to allow participants transfer training content in practice. Based on these two data waves we could examine the ability of UMTM components to predict transfer of training and investigate changes in the UMTM components over time. Participation was voluntary and no incentives were offered.

At T1, \( N = 514 \) participants from 100 courses provided data (response rate = 36.5%). The number of participants per course ranged between 1 and 33 (\( M = 5.14, SD = 4.17 \)). A total of 72% of the participants were women, and the mean age was \( M = 39.73, SD = 11.55 \). Different job positions in the sample included judges (25.8%), public prosecutors (12.4%), legal assistants (45.2%), managers (2.9%) and others (13.6%).

At T2, \( N = 325 \) participants from 86 courses filled in the questionnaire (response rate = 23%). Per course, the number of participants ranged between 1 and 18 (\( M = 3.78, SD = 2.74 \)). From the total number of participants at T2, \( N = 180 \) also filled in a questionnaire at T1.

### 2.2.2. Measures

To measure the UMTM components at both time points, the questionnaire of De Brabander and Glastra (2018) was adapted to fit the purpose of the current study (see Table 2.1. for details). All items were answered on a bipolar seven-point Likert answering scale. Upon inspection of response distributions, the indicators measuring personal and non-personal negative cognitive valences at both time points showed large overrepresentations of values 4 (the middle category) and 7 (negligible). Because of the consequential lack of variance in these variables, we had convergence issues when both indicators were added in the analysis. As such, they were dropped from the study.
<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Answering scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perceived freedom of action</td>
<td>When putting the things that were offered in this course into practice, I will have [...] opportunities for free choice</td>
<td>Very much – Very little</td>
</tr>
<tr>
<td>2. Sense of personal autonomy</td>
<td>When applying this course’s content in my job, I would feel I did so [...]</td>
<td>Completely out of my own volition – Completely out of experienced pressure</td>
</tr>
<tr>
<td>3. Perceived external support</td>
<td>I find the facilities in our court to apply what I have learned successfully [...]</td>
<td>Very obstructive – Very conducive</td>
</tr>
<tr>
<td>4. Sense of personal competence</td>
<td>I personally feel [...] to successfully apply the knowledge, skills, and insights that I acquired in this course</td>
<td>Very able – Not able at all</td>
</tr>
<tr>
<td>5. Subjective norm</td>
<td>I think that colleagues who are important to me would assess me applying what I have learned during the course as</td>
<td>Not positive at all – Very positive</td>
</tr>
<tr>
<td>6. Positive affective valence</td>
<td>When applying the knowledge, skills, and insights that I acquired in this course, I would [...] have a positive feeling</td>
<td>Very often – Rarely or never</td>
</tr>
<tr>
<td>7. Negative affective valence</td>
<td>When applying the knowledge, skills, and insights that I acquired in this course, I would [...] have a negative feeling</td>
<td>Rarely or never – Very often</td>
</tr>
<tr>
<td>8. Positive cognitive valence</td>
<td>Considering the positive consequences, applying the course content in my job would be [...]</td>
<td>Not or hardly rewarding – Very rewarding</td>
</tr>
<tr>
<td>9. Negative cognitive valence</td>
<td>The costs and unwanted consequences of applying the course content in my job would be [...]</td>
<td>Very heavy – Negligible</td>
</tr>
<tr>
<td>10. Transfer intention</td>
<td>I am going to apply the things that I have learned during the course in my job</td>
<td>Completely disagree – Completely agree</td>
</tr>
<tr>
<td>11. Transfer of training*</td>
<td>To what extent did you put the learned content into practice in the written document that you handed in?</td>
<td>None – Very much</td>
</tr>
</tbody>
</table>

*Note: Items 1, 2, 4, 6, and 9 were recoded, so that a high value would indicate much of the measured construct.  
*item was only measured after three weeks
The indicators for positive cognitive valences were answered in relation to participants themselves (personal) and their team, court, judicature in general, and litigants (non-personal). Moreover, feasibility appraisal consisted of an item measuring sense of personal competence and an item regarding perceived external support. We performed a Confirmatory Factor Analysis (CFA) to investigate the factor structure of the nonpersonal cognitive valences and feasibility appraisal. We used multiple goodness-of fit indicators to investigate model-fit of the CFA. These threshold values require RMSEA to be smaller than .06, CFI to approach .95, and SRMR to be smaller than .08 (Hu & Bentler, 1999). The CFA showed that a model in which these indicators loaded on their respective factors fitted well to the data, \( \chi^2(7) = 9.48, p = .22; \) RMSEA = .02 [.00;.06]; CFI = .99, SRMR = .02. In this model, the error terms of the positive cognitive valences in relation to the judiciary and litigants were correlated to reach acceptable fit.

The other components of the UMTM were measured with one indicator per component. It is not standard within social sciences to use one item per construct. Yet, shortening the questionnaire makes it more appealing for practitioners to administer questionnaires (Gogol et al., 2014). Investigating reliability of one-item constructs requires an alternative assessment, which can be done by means of SEM model-fit coefficients. Originally, model-fit coefficients were introduced as a mean to evaluate the reliability of latent structural equated scores (Tucker & Lewis, 1973) and “to avoid models with superfluous parameters that assume meaningless values” (Browne & Cudeck, 1993, p. 136). As unreliable item response patterns are not able to predict or correlate with responses of other items, model-fit indices can provide information regarding the unreliability of item response patterns. In addition, our interest lies in the evaluation of the predictive value of latent structurally equated scores. Unlike regular alpha coefficients, model-fit coefficients do precisely inform about the reliability of these latent scores.

To investigate reliability of the questionnaire representing the UMTM components, we made a path model that contained the UMTM components measured with one item as well as the final structure of the latent variables. All components were related to each other in accordance with the dynamics of the UMTM. In this
model, we constrained relationships between the components in the direction that was proposed by De Brabander and Martens (2014). Moreover, we allowed correlations among all types of valences, among all personal antecedents of these valences, and among their contextual antecedents (cf. De Brabander & Glastra, 2018). Our results showed that the model fitted well to the data, $\chi^2(40) = 195.19, p < .001; \text{RMSEA} = .08 [.07; .09]; \text{CFI} = .94$, SRMR = .05. This provides support for the reliability of the questionnaire used to measure the UMTM components.

To measure transfer of training, at T2 participants were asked whether they had experienced opportunities to apply the course content in practice. A total of 67% of the participants confirmed ($N = 247$). These participants were asked, additionally, with one item to what extent they had actually applied the course content (i.e., transfer of training) on a 5-point Likert scale ranging from 1 (very little) to 5 (very much). To measure transfer, a distinction can be made between transfer quantity and transfer quality (Grohmann et al., 2014). Transfer quantity refers to the frequency to which training content is applied in practice, whereas transfer quality describes the extent to which training content is applied successfully (Grohmann et al., 2014). In this study, we measured transfer quantity. Grohmann et al. (2014) found with a quartile regression that transfer motivation was a predictor of transfer quantity regardless of the amount of content that trainees applied in practice, whereas the predictive value of transfer motivation diminished if trainees had more success in applying training content. As such, measuring transfer quantity was deemed to be a better starting point to investigate the predictive value of components of the UMTM. Participants who had not experienced opportunities to apply the course content were not able to answer the transfer of training item. Therefore, they received the question measuring transfer intention again.

2.2.3. Missing Data Handling

The total percentage of missing data at T1 and T2 was 37.90%. Without missingness that could be attributed to attrition, this percentage is 13.89%. Without missingness that could be attributed to accretion, the missing data is 2.89%. To assess the nature of missing data due to attrition and accretion, two logistic regression analyses were performed. In the first, all variables at T1 were used to predict whether
participants belonged to the group that only provided data for T1 or the group that provided data at both time points. This model did not fit the data better than the baseline model, $\chi^2(15) = 12.84, p = .642$, which indicates that missing data at T1 did not depend on variables under study. The second logistic regression employed the variables at T2 to predict whether participants belonged to the group that only provided data for T2 or the complete data group. This model did improve on the baseline model significantly, $\chi^2(13) = 29.13, p = .006$. As such, group membership at T2 depended on variables in the dataset and missing data cannot be considered completely at random (Schafer & Graham, 2002). However, because participants indicated that they could not fill in the second measurement because of external reasons (e.g., the invitation getting lost in their email or having other work duties) we argue that data can still be considered missing at random (Schafer & Graham, 2002) and can be imputed using multiple imputation.

Multiple imputation is a state-of-the-art technique to handle missing data (Schafer and Graham, 2002). Data were imputed in SPSS, using the fully conditional specification algorithm (Enders, 2010, p. 275). The imputation model included all indicators from T1 and T2, as well as the age and gender of the participants. As such, transfer of training at T2 was also imputed, even though respondents had not had the possibility to transfer training content to the workplace. Likewise, transfer intention at T2 was imputed, even though participants had actually reported to have applied the training content in practice. Prior to imputation, convergence of the imputation algorithm was diagnosed using Enders’ SPSS macro for creating trace plots and the potential scale reduction factor (retrieved from http://www.appliedmissingdata.com/macro-programs.html). These diagnostics showed that the imputation model converged and produced independent imputations after 650 iterations. To ascertain independent imputations, the final 50 datasets were imputed using a conservative 1000 burn-in and 1000 between-imputation iterations.

### 2.2.4. Analyses

Data that are collected among individuals nested in groups are typically analyzed using multilevel analysis (Hox, 2010). To do so requires a certain number of participants per group to achieve enough power. If researchers are interested in
explaining group differences in intercepts or slopes, 100 groups with at least 10 participants are recommended. In the current study, participants came from 100 groups (i.e., different courses included in the study). However, 88 groups contained fewer than ten participants. Therefore, the data collected for this study was not considered suitable for multilevel analysis.

Data were analyzed using structural equation modelling in Mplus 7.31 (Muthén & Muthén, 2012), employing the previously described 50 imputed datasets. Two models were evaluated. To analyze the extent to which components of the UMTM predict transfer of training (research question one), a similar model as for the reliability analysis was used. Moreover, transfer of training was added to this model. In this model, the indicators of T1 were related to each other in accordance with the UMTM and served as predictors of transfer of training at T2. The second model evaluated how changes in UMTM components are related to each other (research question two). For this model, difference scores between indicators at T1 and T2 were calculated. These difference scores were modelled in accordance with the UMTM and used to predict transfer intention and transfer of training at T2. Both transfer intention and transfer of training were included as outcomes because participants who had not gone through transfer opportunities only reported on their transfer intention at T2.

2.3. Results

2.3.1. Descriptive Statistics

Tables 2.2. and 2.3. show means and standard deviations of, and correlations between all indicators from T1 and T2 and their difference scores, respectively. From Table 2.2., it appears that all indicators except transfer intention decreased in the three weeks between T1 and T2. Paired sample t-tests showed that these changes are only significant for personal sense of autonomy, personal sense of competence, and positive cognitive valence.

Moreover, Table 2.3. shows that most correlations were in line with our hypotheses. Notable exceptions in this respect are that only non-personal positive cognitive valence at T1 seemed to be related to transfer intention at T2. Transfer of training, however, was related to most UMTM components at T1. Regarding the correlations between difference scores, it is notable that changes in none of the UMTM
components were related to changes in transfer intention. One exception is change in negative affective valence, which was negatively related to change in transfer intention as expected.

**Table 2.2.**

**Means and Standard Deviations of All Measures at T1 and T2 and Their Difference Scores**

<table>
<thead>
<tr>
<th>Measure</th>
<th>T1 (N = 514)</th>
<th>T2 (N = 325)</th>
<th>T2-T1 (N = 180)</th>
</tr>
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*Note. Personal cognitive valence is indicated by (p). Non-personal cognitive valence is indicated by (np).*

* p < .05, ** p < .01, *** p < .001
Table 2.3.

Correlations Between All Measures at T1 and T2 and Their Difference Scores

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Note. Correlations between difference scores are presented above the diagonal. Personal cognitive valence is indicated by (p). Non-personal cognitive valence is indicated by (np).

* p < .05, ** p < .01, *** p < .001
2.3.2. The Relationship Between UMTM Components and Transfer of Training

To answer our first research question, a path model that was similar to the model with which we investigated reliability was used to examine the relationships between the UMTM components. Moreover, we added transfer of training to the model to investigate the value of the UMTM components in predicting transfer of training at T2. Model-fit was still sufficient to good after adding transfer of training \( \chi^2(52) = 180.71, p < .001; \) RMSEA = .06 [ .05; .07 ]; CFI = .94, SRMR = .07. Figure 2.6 shows that transfer intention at T1 positively predicts transfer of training at T2 with an explained variance of 6% in transfer of training. Transfer intention, in turn, is positively predicted by only non-personal positive cognitive valences. Transfer intention is also directly positively predicted by feasibility appraisal and subjective norm. Whereas feasibility appraisal indirectly predicts transfer intention through non-personal positive cognitive valences as well, subjective norm is only directly related to transfer intention. Sense of personal autonomy is related to all types of valences in line with the hypothesized model, except for non-personal positive cognitive valence. Finally, sense of personal autonomy is positively predicted by perceived freedom of action. Taken together, these results indicate that most antecedents predict the valences and that non-personal positive cognitive valences predict transfer intention, which eventually predicts transfer of training. Moreover, feasibility appraisal and subjective norm also directly predict transfer intention. These outcomes are mostly in line with our hypotheses.
2.3.3. Relationships Between Changes in UMTM Components

To answer our second research question, difference scores of all indicators measured at T1 and T2 were modelled according to the UMTM to predict transfer intention and transfer of training at T2. Since participants reported either transfer intention or transfer of training at T2, affective and cognitive valence were predictors of both transfer intention and transfer of training. A first model, that included all relationships depicted in Figure 2.1., did not fit well to the data, $\chi^2(9) = 32.29, p < .001$; RMSEA = .06 [0.04;0.09]; CFI = .83, SRMR = .03. Because direct effects of feasibility appraisal and subjective norm on transfer intention and/or transfer of training are only considered a possibility by the UMTM, as indicated by the dashed lines in Figure
2.1., these relationships were omitted and model-fit was re-evaluated. The resulting model is displayed in Figure 2.7. and showed good fit with the data, $\chi^2(13) = 22.27, p = .05$; RMSEA = .03 [.00; .06]; CFI = .93, SRMR = .04.

**Figure 2.7.**
*Standardized Relationships Between Difference Scores of UMTM Components, Transfer Intention and Transfer of Training. For Clarity of the Figure, Non-Significant Relationships, Correlations Between Indicators, and Error Terms Were Omitted. Personal Cognitive Valence is Indicated by (P). Non-Personal Cognitive Valence is Indicated by (Np). † Indicates That $p = .056$."

Figure 2.7. shows that transfer intention and transfer of training are positively predicted by changes in personal positive cognitive valences with an explained variance in transfer of training of 7%. This association implies that an increase in personal positive cognitive valences is associated with higher transfer intention and transfer of training. It should be noted that the relationship between personal positive cognitive valence and transfer of training was marginally significant, with a $p$-value of .056. Changes in positive cognitive valences, in turn, were positively predicted by changes in feasibility appraisal and subjective norm. Changes in feasibility appraisal also positively predicted changes in non-personal positive cognitive valence. Moreover, changes in subjective norm positively predicted positive personal cognitive valence and positive affective valence. Finally, changes in sense of personal autonomy
were related positively to changes in positive affective valence and negatively to negative affective valence, in line with the UMTM. To sum up, our results provide evidence that changes in transfer intention and transfer of training can be predicted through changes in other UMTM components, in line with our hypothesis.

2.4. Discussion

This study tested the adequacy of the unified model of task-specific motivation (UMTM) for predicting transfer of training. This was done because transfer of training remains elusive (Botke et al., 2018). The UMTM can inform transfer of training models by providing an explanation for why antecedents in the work environment are related to transfer intention and, subsequently, transfer of training. However, to date, the UMTM was not employed to predict transfer of training. In addition, existing studies evaluating the UMTM did not investigate changes in components of the model and their relationships. Neither did existing research allow participants to engage in the behaviour for which their motivation was measured to evaluate predictive value of the model. As such, this study also provides a next step in evaluating the merits of the UMTM in general.

Results showed that the relationships among UMTM components are largely in line with the model and that, through the dynamics of the UMTM, transfer of training can be predicted over time. This conclusion is corroborated by our findings regarding the relationship between changes in UMTM components and the prediction of transfer of training through those changes. In sum, (changes in) most components of the model are directly or indirectly associated with transfer intention and, subsequently, transfer of training. Our outcomes are therewith mostly in line with our hypotheses.

Unlike previous research (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018), this study found a very central role of feasibility appraisal. This is in line with the studies of Massenberg et al. (2017) and Salamon et al. (2022b) who found that self-efficacy and support at the work floor predict transfer motivation. On the other hand, only few effects were found for sense of personal autonomy which is not in line with the study of Colquitt (2000) who found that perceived autonomy was a predictor of transfer motivation. These results may be explained by the fact that
employees in the Dutch judiciary tend to have a high professional autonomy (e.g., judges are required to make independent judgements and are appointed for life; Taal, 2016). As such, freedom of action and personal autonomy may be treated in this particular context as given conditions instead of a variable in their motivation to apply training content. This interpretation underscores conclusions of previous research that the specific dynamics of UMTM components are task dependent. Also, in contrast with previous studies, we found no relationship between affective valences and personal positive cognitive valences and transfer intention when controlling for nonpersonal cognitive valences. This implies that employees within the judiciary are primarily motivated by non-personal benefits resulting from applying the training content in practice. This is in line with the work motives of judges. Research showed that the main motivation of judges to work as a judge is to pursue the interests of the public service (i.e., fair and impartial application of the law), and not necessarily to satisfy personal interests (Gomes et al., 2016; Stout, 2002).

Notwithstanding the disparity between current results and previous research, our findings provide the first initial evidence for the predictive value of components of the UMTM for actual performance of task-specific action. Moreover, by showing that the model works in another context than the teacher professionalisation context and that changes in many components of the UMTM are related in accordance with its theoretical assumptions, this study extends earlier cross-sectional research (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018). In this study, task-specific action was operationalized as transfer quantity as opposed to transfer quality. As previous research (Grohmann et al., 2014) indicated that the link between transfer motivation and transfer quantity and quality works differently, it could be interesting for future research to investigate to what extent the UMTM also is able to predict transfer quality or to investigate differences in the value of the UMTM in predicting transfer quality and transfer quantity.

Furthermore, the analysis of change in this study showed a decrease in sense of personal autonomy, sense of personal competence and personal positive cognitive valence after having gone through action opportunities. Participants’ perceptions of the contexts in which they applied training content thus remained rather stable. These
results could suggest that merely going through action opportunities changes employees’ transfer motivation. Thus, experiencing what it means to transfer training content to work practice can cause individuals to make more realistic assessments of the volitional nature of their behaviour, their ability to perform that behaviour successfully, and the value of doing so. This would suggest a feedback loop in the UMTM for these components, at least in the context of motivation to transfer training. The theory of planned behaviour accounts for the possibility of such a feedback loop by including the concept of ‘actual behavioural control’, which refers to individuals’ actual skills and abilities and the presence of actual environmental constraints and facilitators, over and above the perceptions of individuals (Fishbein & Ajzen, 2010, p. 21). Actual behavioural control determines the strength of the relationship between behavioural intention and actual behaviour. Moreover, actual behavioural control feeds back into the system of personal and environmental antecedents that the UMTM adopts from theory of planned behaviour to determine motivated behaviour. It would therefore be interesting for future research to further investigate whether a feedback loop exists in the UMTM as a consequence of going through action opportunities, also in other contexts than the one under study in this paper.

For transfer of training models, the effect of valences on transfer intention underscores the necessity to approach transfer motivation as a multidimensional construct (Jacot et al., 2015; Gegenfurtner, 2013; Gegenfurtner et al., 2009a). Transfer of training models can also learn from this study that effects of contextual antecedents on transfer motivation can be explained via personal experiences of feasibility. This explanatory mechanism can refine theorizing about predictors that may influence transfer of training. It may, for example, explain results regarding the effect of performance feedback on transfer motivation, which are inconsistent (cf. Kirwan & Birchall, 2006; Massenberg et al., 2017). Transfer of training models can learn from self-determination theory assumptions, which are extended into the UMTM, that only certain types of feedback have competence enhancing and motivating effects, which may explain these inconsistent findings. It would be interesting for future research to investigate whether effects of specific contextual antecedents that are known to influence transfer motivation are present because they contribute to employees’
feasibility appraisals. The UMTM provides a framework for theorizing how these antecedents may be interrelated in their effects.

### 2.4.1. Limitations and Directions for Future Research

Some limitations should be acknowledged. Firstly, it should be noted that the amount of explained variance in transfer of training through the dynamics of the UMTM is rather low. This implicates that future studies should include other components that influence transfer of training, especially in terms of training characteristics. Such a component could include, for example, the quality of the training which has been shown to predict transfer of training (Grossman & Salas, 2011).

Secondly, this study’s measures for negative cognitive valences could not be used in our analyses. This was caused by large overrepresentations of the most negative and neutral response options in these measures, which indicated that questions were either not understood well or could not distinguish between participants. In hindsight, the reason for this may have been that participants could not imagine ‘costs or unwanted consequences’ of applying the course content for themselves or others. Therefore, future research should provide examples of what such costs of unwanted consequences could be.

Thirdly, the current assessment of transfer of training concerned a self-report measure. As such, effects of UMTM components were found on participants’ subjective experiences of having applied training content in the work context. Although subjective experiences are the only valid source of information regarding types of motivation from the UMTM, subjective experiences of transfer of training are known to differ from ratings by thirds (Blume et al., 2010). Moreover, using self-reports can lead to common method bias. More insight in the predictive value of the UMTM for predicting transfer of training would therefore require intersubjective measures of transfer, like the ratings of trainers or supervisors on whether the content is being used in practice, independently of employees’ own experiences.

### 2.4.2. Practical Implications

We have several practical recommendations that can be used by organizations and training institutes to enhance transfer of training. It is important that trainers and
policy makers focus on enhancing sense of personal competence, perceived external support and subjective norm. Sense of personal competence could be stimulated by setting goals at the end of trainings that aim at what one wants to achieve through applying training content (Brown & Warren, 2009). Moreover, perceived external support could be fostered by ensuring that trainees receive sufficient support from colleagues in applying training content. For example, supervisors could encourage trainees to apply training content and they could give frequent feedback about the application of training content in practice (Grossman & Salas, 2011). Furthermore, subjective norm could be enhanced by letting multiple supervisors and peers of the same organization take part in the training. This can increase the likelihood that the content of training aligns with the norms of the organization (Gilpin-Jackson & Bushe, 2007). In addition, this can increase positive attitudes among colleagues regarding the application of the training content (Salamon et al., 2022a).

We also recommend trainers and practitioners to implement the questionnaire representing the UMTM components to examine the extent to which training content is used in practice at the end of trainings. Our results underline that the questionnaire has a value in predicting transfer of training and shows which personal and contextual antecedents could be improved to enhance transfer of training via types of transfer motivation. Moreover, the survey is relatively short. Administering short questionnaires can be enhancive for the response rate of the questionnaire (Gogol et al., 2014). Thus, this questionnaire can be a practical instrument for organizations to acquire more insight in the applications of trainings in practice.

Together, the recommendations inferred from the results of our study can provide organizations and training institutes with a tool that can be used to monitor the transfer of trainings and inform measures aiming to improve transfer of training. Ultimately, this can lead to increasing the desired impact of trainings on organizational practice and provide a better return on all the investments made in trainings.