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### 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 3

## How to Predict Transfer of Training? Investigating the Application of the Unified Model of Task-Specific Motivation

This chapter is based on De Jong, B., Cornelissen, L. J. F., Jansen in de Wal, J., Van der Lans, R., & Peetsma, T. (2023). How to predict transfer of training? Investigating the application of the unified model of task-specific motivation. *International Journal of Training and Development*, 27(2), 242-262. doi:10.1111/ijtd.1229721

### **Abstract**

Transfer motivation is an important predictor of transfer of training. However, earlier research often did not investigate transfer motivation as a multidimensional construct. The unified model of task-specific motivation (UMTM) takes into account that (transfer) motivation is multidimensional by including both affective and cognitive types of motivation and their personal and contextual antecedents. Prior research has provided evidence that the UMTM can predict self-reported transfer of training, but is unclear about whether it also can predict transfer reported by expert external raters. Moreover, it is unclear whether controlling for prior knowledge matters for the relationship between transfer motivation and transfer of training. This study improves on existing research by accounting for both these gaps in the literature. Data was collected among 299 participants who filled in a questionnaire about the UMTM components directly after attending a writing training. They also handed in written documents before, and six weeks after the training, which were rated on transfer by trainers. Outcomes showed that components of the UMTM positively predict externally reported transfer when prior knowledge was controlled for. The outcomes imply that the UMTM has predictive value for transfer of training and points out which components influence whether transfer does or does not occur.

*Keywords:* unified model of task-specific motivation, transfer motivation, transfer intention, transfer of training, prior knowledge

### 3.1. Introduction

Organizations use systematic training to equip employees with knowledge, skills and insights in order to keep up with changes in our society and remain competitive (Grossman & Salas, 2011; Noe, et al., 2014). However, transfer of training (i.e., the application of acquired knowledge, skills, and insights in the working context) is often insufficient (Grossman & Salas, 2011). Previous research has indicated that transfer motivation (i.e., the desire of employees to use the knowledge, skills and insights acquired during the training in practice; Noe & Schmitt, 1986) positively predicts transfer of training (Burke & Hutchins, 2007; Grohmann, et al., 2014; Grossman & Salas, 2011). Through stimulating transfer motivation, transfer of training can also be improved (Burke & Hutchins, 2007; Grohmann, et al., 2014; Grossman & Salas, 2011).

Noe and Schmitt's (1986) one-dimensional conceptualization was long used to approach transfer motivation (Gegenfurtner et al., 2009b; Gegenfurtner et al., 2013). However, motivational theories (e.g., self-determination theory, expectancy-value theory), indicate that motivation consists of multiple types (Eccles & Wigfield, 2002; Ryan & Deci, 2000). The same can be presumed about transfer motivation. Gegenfurtner and colleagues (2013, 2022) found that different types of transfer motivation exist, which have different effects on transfer intention. This indicates that transfer motivation should be approached as a multifactorial construct containing multiple components, in line with current motivational theories. Transfer motivation is therefore labelled as multidimensional in the transfer motivation literature (Gegenfurtner, 2013; Gegenfurtner & Quesada-Pallarès, 2022).

However, different theories approach motivation differently (De Brabander and Martens 2014). For example, the self-determination theory and flow theory stress the affective aspects of motivation, whereas expectancy-value theory focuses on its cognitive aspects. To advance research on motivation, De Brabander and Martens (2014) have unified multiple motivational theories into one model: The unified model of task-specific motivation (UMTM). The UMTM integrates affective and cognitive types of motivation and includes personal and contextual antecedents of motivation that also have been found to predict transfer motivation and transfer of training (e.g.,

self-efficacy (Gegenfurtner et al., 2009b), a supportive work environment (Massenberg et al., 2015)).

Since the UMTM is relatively new, empirical support for its tenability is scarce. Yet, studies found support for its premises (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018) and its ability to predict transfer of training as indicated by trainees (De Jong et al., 2020). However, it is unclear whether transfer of training as rated by external sources (e.g., peers, supervisors) can be predicted through components of the UMTM. Transfer of training is often measured through self-reports (e.g., Massenberg et al., 2015; Velada et al., 2007). Yet, such self-reports can include socially desirable answers, leniency and upward bias (Chiaburu et al., 2010; Gegenfurtner, 2011; Segers et al., 2003) and do not always correspond with reports of external sources (Blume et al., 2010; Taylor et al., 2009). External sources of transfer, on the other hand, do seem to correspond more with each other on transfer of training (Taylor et al., 2009). That is, the alignment between sources of externally-reported transfer is higher than the alignment between self- and external-reports. As such, transfer of training might be more objectively estimated when this is based on external sources (Taylor et al., 2009). Moreover, by using external sources, there is no common method bias of using both self-reported transfer motivation and self-reported transfer (Gegenfurtner, 2011), which can lead to inflated relationships between these constructs (Podsakoff et al., 2003).

Moreover, transfer of training studies often do not include prior knowledge (i.e., pretraining application) as a control variable (Gegenfurtner, 2013). However, without considering prior knowledge, it is unclear whether content used in practice is a result of attending the training, or because trainees already (unintentionally) used this content before the training. As a result, conclusions about the extent to which transfer of training (i.e., post-training application) has occurred may be upwardly biased. By including prior knowledge, the effect of the training (i.e., the difference between the application before and after the training) can be investigated more accurately. As a result, the accuracy of estimating the association between transfer motivation (as approached through the UMTM) and transfer of training might be improved. Moreover, previous research has indicated that prior knowledge correlates

with transfer intention (Gegenfurtner, 2013). More prior knowledge can prepare trainees better for training participation which can motivate trainees to participate in the learning activity in order to transfer the training content to practice (Bhatti et al., 2013). Prior knowledge could therefore influence both transfer motivation and transfer of training and should be accounted for.

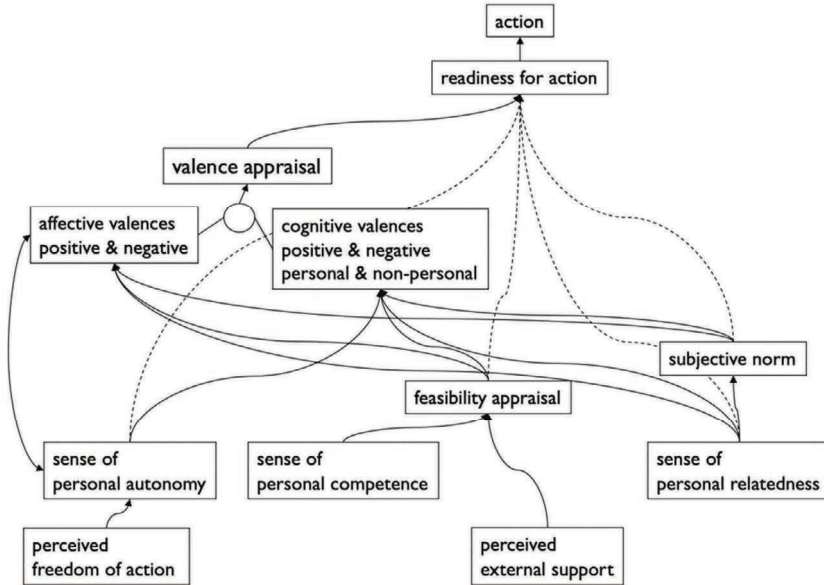
Because of these reasons, this study investigates the utility of the UMTM in predicting transfer of training as rated by external sources, while controlling for prior knowledge. In doing so, this study also aims to investigate the assumed relationships between the UMTM components and takes the multidimensionality of transfer motivation into account. Insights of this study can advance knowledge regarding the association between transfer motivation and transfer of training and how trainers and policy makers could stimulate transfer motivation to eventually increase impact of trainings on working practice.

### **3.1.1. The Unified Model of Task-specific Motivation**

The UMTM identifies components that determine task-specific motivation (i.e., motivation to exert a relatively specific action option) of individuals (See Figure 3.1.; De Brabander & Martens, 2018). It contains multiple types of motivation which stem from different theories, namely: self-determination theory (Ryan & Deci, 2000), flow theory (Csikszentmihalyi, 1990), expectancy-value theory (Wigfield & Eccles, 2000), social cognitive theory (Bandura, 1989), theory of planned behaviour (Ajzen, 1991) and person-object theory of interest (Krapp, 2002). The UMTM integrates these theories through acknowledging that the origin of motivation lies in both affective and cognitive motivational components.

**Figure 3.1.**

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



These affective and cognitive motivational components are represented in the model as affective and cognitive valences and are types of motivation. *Affective valences* are feelings individuals expect to experience when they perform an activity and are activated automatically when activities are considered (e.g., feeling excited about applying an acquired skill; De Brabander & Martens, 2014). *Cognitive valences* are defined as values that are ascribed to the consequences of performing an activity (e.g., stimulating work productivity by applying the training content). These values emerge through active reflection when individuals consider activities. The value of performing an activity can be seen for oneself, but also for others (e.g., colleagues, supervisors). Therefore, cognitive valences can be personal and non-personal (De Brabander & Martens, 2014).

Both cognitive and affective valences can be positive or negative. When the valences are positive, individuals have positive feelings about and/or anticipate beneficial outcomes of performing the activity, whereas the opposite is the case when the valences are negative. Positive valences are expected to positively predict



readiness for action. Negative valences, however, are hypothesized to negatively predict readiness for action (De Brabander & Glastra, 2018). *Readiness for action* can be defined as the willingness of individuals to perform an action (De Brabander & Glastra, 2018). Transfer intention is an example of readiness for action and corresponds to Noe and Schmitt's (1986) original definition of transfer motivation. *Action* is conceptualized as showing task-specific behaviour and is positively predicted by readiness for action (De Brabander & Glastra, 2018). Transfer of training is an example of action.

### 3.1.2. Task-Specific Antecedents of Transfer Motivation

The UMTM also identifies antecedents of affective and cognitive valences (De Brabander & Martens, 2014). In this respect, the UMTM differentiates between feasibility appraisal, autonomy related antecedents and social antecedents that are derived from the aforementioned motivational theories (De Brabander & Martens, 2014). *Feasibility appraisal* is defined as individuals' appraisals about being able to perform tasks successfully. This component consists of a personal and contextual facet. The personal facet is *sense of personal competence*, which refers to individuals' judgement of having the capacities to perform a task successfully. The contextual facet is *perceived external support*, which is defined as the individuals' appraisals about the extent to which their context facilitates or hinders performing the action (e.g., lack of suitable work equipment, expertise among colleagues; De Brabander & Martens, 2014; Grossman & Salas, 2011). Feasibility appraisal positively predicts positive valences, and negatively predicts negative valences, in line with effects of competence components in many motivational theories. Direct positive effects on readiness for action are also expected, in line with the effects of perceived behavioural control on intention in theory of planned behaviour (Ajzen, 1991).

The second category of antecedents revolves around autonomy, for which also a distinction is made between a personal and contextual facet. The contextual facet concerns *perceived freedom of action*, which refers to individuals' experience of freedom to make decisions about the selection and performance of an action (e.g., freedom to choose when to use acquired skills in practice; De Brabander & Martens, 2014). In line with the self-determination theory, the UMTM posits that perceived freedom of action

predicts the personal facet; *sense of personal autonomy*. This component describes the extent to which individuals experience an internal locus of causality and volition for choosing and performing an activity (e.g., feeling unpressured in how to use acquired knowledge in practice; De Brabander & Martens, 2014). Sense of personal autonomy positively predicts positive cognitive valence, whereas it negatively predicts negative cognitive valences. Furthermore, it has a reciprocal association with affective valences (De Brabander & Martens, 2014). Moreover, direct positive effects of sense of personal autonomy on readiness for action are also expected based on previous research (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018).

The third category of antecedents contains social antecedents and distinguishes between subjective norm and sense of personal relatedness. *Subjective norm* refers to the propensity of individuals to abide by (dis)agreement of significant others about performing certain behaviour (e.g., approval of colleagues about when individuals apply acquired knowledge and skills). The second component is *sense of personal relatedness*, which is defined as the extent to which one feels connected to other people who participate in the context of the task-specific action (e.g., the extent that you feel connected with colleagues when you work together). Sense of personal relatedness is expected to predict subjective norm as it is assumed that a higher connectedness with other people participating in the context of the task-specific action will increase the likelihood that individuals will abide by the judgement of significant others (De Brabander & Martens, 2014). Eventually, subjective norm and relatedness positively predict positive valences whereas they negatively predict negative valences (De Brabander & Martens, 2014). Moreover, a direct positive effect of subjective norm on readiness for action is also possible, in line with the theory of planned behaviour (Ajzen, 1991). Based on previous research (De Brabander & Martens, 2018), direct positive effects of sense of personal relatedness on readiness for action are also possible.

### 3.1.3. The Present Study

To sum up, this study investigates the utility of the UMTM in predicting transfer of training. External sources, instead of self-reports, are used as indicator of transfer, while controlling for prior knowledge. In doing so, we also investigate the

dynamics between the UMTM components and take the multidimensionality of transfer motivation into account. In this study, we formulate the following research questions:

1. To what extent do the UMTM components relate to each other in accordance with the dynamics of the UMTM?
2. To what extent are the UMTM components predictive for transfer of training while controlling for prior knowledge?

We formulated multiple hypotheses based on previous research (Blume et al., 2010; De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018; De Jong et al., 2020; Gegenfurtner, 2013). Firstly, we expect that the relationships between the valences and personal and contextual antecedents can be modelled in line with the UMTM. Secondly, we expect components of the UMTM to predict transfer of training. Thirdly, we expect that prior knowledge improves the accuracy of the association between transfer intention and transfer of training.

## **3.2. Method**

### **3.2.1. Sample and Procedure**

This study was conducted at the Dutch National training institute for the judiciary, which provides trainings for judicial employees. Data were collected among trainees who participated in one of 48 included trainings focused on writing skills (e.g., writing more concise verdicts; writing more structured e-mails). All trainings were group trainings and contained a mix of exercises and lectures provided by trainers. Lectures were focused on ways to improve text structure, spelling rules, argumentation and formulating more compact sentences. Moreover, trainees performed several exercises to practice their writing skills. The exercises consisted of example texts that trainees were instructed to improve based on the content discussed in the lecture components. Trainers used both individual and group exercises and after finalizing they were consistently discussed plenary. At the end of each training, trainees were asked to participate in this study at the end of their trainings.

In this study, transfer of training was indicated by trainers of the training. They rated transfer of training based on written documents that were handed in by trainees (see Table 3.1. for a schematic overview of the procedure used in this study).

**Table 3.1.***Timeline of the Procedure Followed in this Study.*

	T1: Prior to the training	T2: Directly after the training	T3: after 6 weeks
Participant	Hands in written documents based on which prior knowledge is assessed	Fills in questionnaire	Hands in written documents based on which transfer of training is assessed
External source	Rates written documents that were handed in by participants		Rates written documents that were handed in by participants

These written documents were representative for the type of written documents trainees made for their work. The trainers were experts on the content of the training (i.e., in assessing the quality of written documents). As such, they can be assumed to make an accurate assessment as to what extent training content is being used in practice. Trainings were included if trainers could assess prior knowledge (i.e., pretraining application) before the training and transfer of training (i.e., post-training application) after the training. The number of contact moments during the included trainings ranged between half a day and three days and the period of the trainings ranged between half a day and three months. A total of 10 trainings (20.83%) were offered in-person, whereas the other 38 trainings (79.17%) were provided online. In online trainings, content was provided synchronously and trainees attended these trainings via platforms such as Teams, Zoom or Skype. Attendance among 22 trainings (45.8%) was mandatory, whereas the other 26 trainings (54.2%) were attended voluntarily.

Existing research varies in the time period between training (T2) and measurement of transfer of training (T3), which ranges between three weeks and one year (Brown 2005; Burke and Baldwin 1999; De Jong et al., 2020; Gegenfurtner 2013; Saks and Burke 2012; Velada et al., 2007). In this study, the time period of six weeks between T2 and T3 was based on the likelihood that participants would have had opportunities to transfer the training content, which was based on the judgment of trainers.

A total of 299 out of 439 prospective participants agreed with participation (response rate = 68.1%). Partaking was voluntary and without incentives. At T1, prior

knowledge was measured among 198 participants (response rate = 45.1%). At T2,  $N = 249$  participants from 47 trainings filled in a questionnaire (response rate = 56.7%). The number of participants per training ranged between 1 and 12 ( $M = 5.19$ ). The mean age was ( $M = 39.19$ ;  $SD = 11.28$ ) and most participants were women (81.5%). Participants practiced a range of different jobs, including legal assistant (46.1%), administrative assistant (38.5%), judge (6.7%), and legal administrative assistant (4.4%). The participants had on average 6.57 years ( $SD = 8.92$ ) experience at their current job. A total of 170 participants filled in the questionnaire and were rated on their prior knowledge (response rate = 38.7%). At T3,  $N = 147$  participants (response rate = 33.5%) were rated on their post-knowledge. Finally, 98 participants (response rate = 22.3%) handed in all data.

### **3.2.2. Measures**

#### ***UMTM-questionnaire***

An adapted version of a questionnaire that measures the UMTM components was used for this study (see Table 3.2.; De Brabander & Glastra, 2018). Nonpersonal positive and negative cognitive valences were measured with multiple items that refer to stakeholders for which applying training content could have value (i.e., team, court, judiciary and litigants). Answers were given on a seven-point Likert answering scale.

**Table 3.2.***Items and Answering Scales for the Questionnaire*

Construct	Item	Answering scale
1. Sense of personal autonomy	When applying this course's content in my job, I would feel I did so [...]	Completely out of my own volition – Completely out of experienced pressure
2. Perceived freedom of choice	When putting the things that were offered in this course into practice, I will have [...] opportunities for free choice	Very much – Very little
3. Sense of personal competence	I personally feel [...] to successfully apply the knowledge, skills, and insights that I acquired in this course	Very able – Not able at all
4. Perceived external support	I find the facilities in our court to apply what I have learned successfully [...]	Very obstructive – Very conducive
5. Subjective norm	I think that colleagues who are important to me would assess me applying what I have learned during the course as [...]	Not positive at all – Very positive
6. Sense of personal relatedness	I feel [...] with colleagues that are involved when I apply the learned content in practice	Closely connected – Barely connected
7. Positive affective valence	When applying the knowledge, skills, and insights that I acquired in this course, I would [...] have a positive feeling	Very often – Rarely or never
8. Negative affective valence	When applying the knowledge, skills, and insights that I acquired in this course, I would [...] have a negative feeling	Rarely or never – Very often
9. Positive cognitive valence personal	Considering the positive consequences, applying the course content in my job would be [...] for me personally	Not or hardly rewarding – Very rewarding
10. Positive cognitive valence nonpersonal	Considering the positive consequences, applying the course content in my job would be [...] for my team	Not or hardly rewarding – Very rewarding
11. Negative cognitive valence personal	The costs and unwanted consequences of applying the course content in my job would be [...] for me personally	Very heavy – Negligible
12. Negative cognitive valence nonpersonal	The costs and unwanted consequences of applying the course content in my job would be [...] for my team	Very heavy – Negligible
13. Transfer intention	I am going to apply the things that I have learned during the course in my job.	Completely disagree – Completely agree

*Note.* Items 1, 2, 3, 6, 7, 11 and 12 were recoded, so that a high value would indicate much of the measured construct.

We performed a confirmatory factor analysis (CFA) using Mplus 8.0 (Muthén & Muthén, 2017) to investigate the factor structure of positive and negative cognitive valence and feasibility appraisal (i.e., sense of personal competence and perceived

external support). In earlier research investigating the UMTM (De Brabander & Glastra, 2018, 2021), personal and nonpersonal positive cognitive valence were distinguished. However, based on a preliminary sensitivity analysis, we detected a high correlation between personal and nonpersonal positive and negative cognitive valence in the data ( $r = .79$  for positive cognitive valence and  $r = .80$  for negative cognitive valence). Consequently, the effect of each component on transfer intention was suppressed by presence of the other. We therefore decided to continue with a positive and negative cognitive valence factor in which personal and nonpersonal cognitive valence loaded on the same factor separately, leading to two higher order factors for cognitive valence (i.e., a positive and negative cognitive valence factor). Finally, perceived external support and sense of personal competence loaded on feasibility appraisal.

To test model-fit, we used multiple goodness-of fit indices. For RMSEA and SRMR, a value below .08 indicated a sufficient fit and below .05 was classified as good. For the TLI and CFI a value above .90 indicated a sufficient fit and above .95 was interpreted as good (Geiser, 2012). We made theory-driven modifications to the model to improve model-fit. After removing the positive and negative cognitive valence items regarding the litigants and after adding a correlation between error terms of the items regarding the judiciary and the court, we found a good model-fit: ( $\chi^2(28) = 30.301, p = .35; RMSEA = .02 [.00; .05]; CFI = 1.00, TLI = 1.00, SRMR = .03$ ).

The other constructs of the UMTM were operationalized with one item and answered on a bipolar seven-point Likert answering scale. Using one item per construct is non-standard in social sciences. The procedure efficiently shortened the questionnaire, making its administering much more appealing to practitioners (Gogol et al., 2014). However, the reliability of item responses needs to be assessed alternatively by inspection of SEM model-fit coefficients. Model-fit coefficients were originally introduced as coefficients to evaluate the reliability of latent structural equated scores (Tucker & Lewis, 1973) as well as “to avoid models with superfluous parameters that assume meaningless values” (Browne & Cudeck, 1993, p. 136). Because unreliable item response patterns cannot predict or correlate with responses on other items, model-fit coefficients directly inform about unreliability in item

responses. Moreover, the interest here is in the evaluation of predictive value for the latent structurally equated scores. Model-fit coefficients, as opposed to most regular alpha coefficients, do precisely inform about reliability of these latent scores.

To investigate reliability, we made a SEM path model in Mplus (Muthén & Muthén, 2017) containing the final structure of the latent variables and the other UMTM components in line 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 between all valences and among the contextual and personal antecedents (cf. De Brabander & Glastra, 2018). In addition to the RMSEA, CFI, TLI and SRMR, we also examined the AIC, the BIC and the SSA-BIC to compare model-fit of this model with models that we used to answer our research questions discussed in the results section. These models were not nested. As such, the AIC, BIC and SSA-BIC are required to compare model-fit, for which lower values indicate a better model-fit (Kline, 2015). The results showed that the item representing sense of personal relatedness consistently did not show associations in the direction that was hypothesized by De Brabander and Martens (2014), leading to convergence issues. We therefore decided to exclude this item which implies that sense of personal relatedness is not included in the analysis. After removing this item, we found a good model-fit ( $\chi^2(76) = 98.526, p = .04$ ; RMSEA = .04 [.01; .05]; CFI = .99, TLI = .98, SRMR = .04; AIC = 10798.99; BIC = 11065.71; SSA-BIC = 10824.79). This provides support for the reliability of the questionnaire used to measure the UMTM components.

### ***Prior Knowledge and Transfer of training***

Prior knowledge was rated based on the following question: *“To what extent did the trainee already put the learned content into practice in the written document that was handed in?”*. Transfer of training was rated with the following question: *“To what extent did the trainee put the learned content into practice in the written document that was handed in?”*. Trainers were primed to assess the quality, as opposed to the quantity, with which training content was already applied prior to the training and after the training. This was done through several questions that were answered prior to answering the item measuring prior knowledge or transfer of training. An example of such a



question is: *“To what extent did the trainee formulate the legal considerations in an understandable, reasonable and correct way?”*.

For 27 trainings (56.3%), an external rater that was a trainer, but did not teach the specific training, rated transfer. These will be referred to as ‘external raters’. The other 21 trainings were rated by the trainers of the trainings. These will be referred to as ‘trainer raters’. We investigated mean differences between prior knowledge ratings and transfer ratings as made by trainer raters and external raters with an independent t-test, to investigate whether these two types of ratings provided comparable indications of transfer. There was no significant difference for prior knowledge ( $t(196) = 1.31, p = .19$ ), but the mean score for transfer was significantly higher among trainer raters ( $t(145) = 3.71, p < .001$ ). We also investigated interrater reliability for 10% ( $N = 40$ ) of the data. That is, 10% of the written documents that were handed in were rated by both trainer raters and external raters on prior knowledge and transfer of training. We calculated the intraclass correlation coefficient (ICC) using a two-way random effects model. The ICC was 0.64, indicating a moderate reliability (Koo & Li, 2016). Due to these differences, we created a dummy variable to distinguish between external raters and trainer raters in the data-analysis.

### 3.2.3. Data-analysis

Before analysing the data, we investigated the assumptions of normally distributed data (Rasch et al., 2011), homoscedasticity, absence of univariate and multivariate outliers, multicollinearity and linearity (Kline, 2015) and independence of residuals (Barker & Shaw, 2015). All assumptions were met.

To answer our research questions, we employed the final SEM path model that was also used for reliability analysis and in which the UMTM components were modelled in accordance with the UMTM. Transfer of training was included as the final outcome variable. The dummy variable indicating who rated transfer (0 = trainer rater, 1 = external rater) was included as predictor of transfer, whereas prior knowledge was a predictor of transfer intention and transfer of training. To evaluate model-fit, the aforementioned fit-indices were used.

In addition, we analysed whether attending a training mandatorily versus voluntarily and attending a training online versus in-person moderated the

hypothesized relationships between transfer motivation and transfer. This was done because previous research indicated that mandatory versus voluntary participation moderates the quality of transfer motivation in predicting transfer of training (Gegenfurtner et al., 2016). Moreover, we used both online and in-person trainings in this study. Previous research indicated that online or in-person training can affect motivation to learn (Dumford & Miller, 2018), which can affect transfer motivation (Gegenfurtner et al., 2009b). We therefore tested for the moderating effect of online or in-person training. We did so by investigating the effect of both mandatory versus voluntary participation and online versus in-person training on the relationships between the valences and transfer intention and for the relationship between transfer intention and transfer of training.

We used two dummy variables representing mandatory versus voluntary participation (0 = mandatory, 1 = voluntary) and online versus in-person training (0 = online, 1 = in-person), respectively, to investigate the effects of these training characteristics. We created interaction variables between each dummy and each motivational variable (i.e., all valences and transfer intention). The interaction variables for the valences and each dummy were used as predictors of transfer intention and the interaction between transfer intention and each dummy were used as predictors of transfer of training. We added each dummy and interaction variable separately and only kept them in the model if they were significant predictors. We did this for mandatory versus voluntary and online versus in-person training separately. As a final step, we investigated the effect of mandatory versus voluntary and online versus in-person training together among the dummies and interaction variables that were predictors in previous steps. Based on this, we created a final model. As this model is not nested with the model without moderators, we only retained the model with moderator(s) if the AIC, BIC and SSA-BIC were lower than those of the model without moderator(s).

Since each participant took part in a training in which other participants also took part, they were clustered in groups. As we did not formulate group-level hypotheses, we controlled for the clustered structure of the data by using cluster-robust standard errors and fit statistics (using the option 'type = complex' in Mplus).

## 3.3. Results

Table 3.3.

Correlation Matrix, Means and Standard Deviations of the UMTM Components, Prior Knowledge and Transfer of Training

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Perceived freedom of action												
2. Sense of personal autonomy	.32***											
3. Perceived external support	.38**	.17*										
4. Sense of personal competence	.34***	.32***	.15*									
5. Subjective norm	.26***	.25***	.33***	.23***								
6. Positive affective valence	.29***	.50***	.18**	.47***	.36***							
7. Negative affective valence	-.32***	-.34***	-.34***	-.34***	-.27**	-.39***						
8. Positive cognitive valence	.17*	.24***	.27***	.28***	.19*	.48***	-.24***					
9. Negative cognitive valence	-.26***	-.28***	-.10	-.26***	-.11	-.29***	.37***	-.05				
10. Transfer intention	.12*	.19**	.21**	.17**	.09	.26***	-.17**	.32***	-.10			
11. Prior knowledge	.08	.03	.00	.17*	-.10	.07	.03	-.20*	-.06	.06		
12. Transfer of training	-.13	.06	-.12	.01	-.19	-.07	-.02	.07	-.02	.13	.36***	
Mean	5.13	5.75	4.86	5.62	5.02	5.47	2.60	5.53	2.75	5.60	4.48	5.40
Standard deviation	1.24	1.28	1.11	1.02	1.15	0.97	1.33	1.35	1.55	1.74	1.04	0.98

\*  $p < .05$ \*\*  $p < .01$ \*\*\*  $p < .001$

### 3.3.1. Descriptive Statistics

Table 3.3. shows correlations, means and standard deviations of the UMTM components, transfer of training and prior knowledge. Most correlations are in accordance with the UMTM. There are correlations between the antecedents and valences and all valences except for negative cognitive valence correlate with transfer intention. In addition, transfer of training correlates with prior knowledge, but not with the other components.

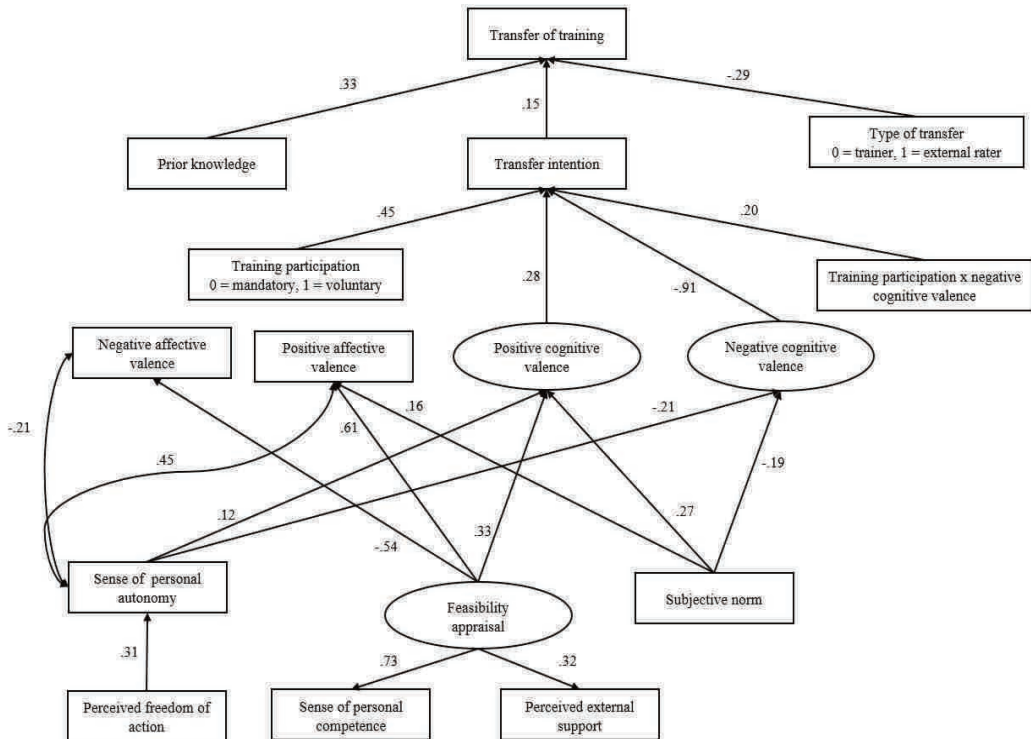
### 3.3.2. Relationships Between the UMTM Components

To answer our first research question, we investigated whether the components of the UMTM were related to each other in accordance with the model's dynamics. Model-fit was still sufficient to good after adding transfer of training, prior knowledge and type of transfer to the model ( $\chi^2(122) = 189.485, p < .01$ ; RMSEA = .05 [.04; .07]; CFI = .94, TLI = .92, SRMR = .06; AIC = 7808.34; BIC = 8074.94; SSA-BIC = 7814.85). The AIC, BIC and SSA-BIC were lower for this model than of the model used to examine reliability of the UMTM questionnaire. As such, this model was retained.

As a next step, we investigated the moderating effect of online versus in-person training and mandatory versus voluntary participation. We found an interaction effect of mandatory versus voluntary participation with negative cognitive valence in predicting transfer intention. Without this interaction, both negative cognitive valence and mandatory versus voluntary participation were no predictors of transfer intention, providing evidence for a moderation effect. Model-fit of the model including this interaction was comparable to the model without the moderator (AIC = 7804.78; BIC = 8077.53; SSA-BIC = 7811.46). As the model including the moderator is theoretically more relevant, we decided to retain this model. Figure 3.2. depicts significant relationships between the components ( $p < .05$ ).

**Figure 3.2.**

*Standardized Relationships Between the Components. For Clarity of the Figure, we Only Added Significant Relationships ( $p < .05$ ) and Omitted Manifest Variables and Lower Order Latent Variables of Positive and Negative Cognitive Valences. Moreover, Correlations Between the Components Were Omitted. Curved Lines Represent Reciprocal Relationships.*

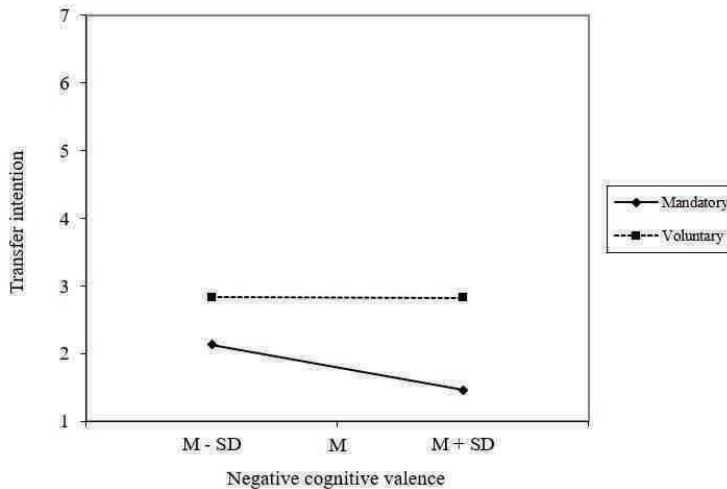


In this model, sense of personal autonomy is positively predicted by perceived freedom of action. Sense of personal autonomy correlates positively with positive affective valence and negatively with negative affective valence. Moreover, negative affective valence is negatively predicted by feasibility appraisal, whereas positive affective valence is positively predicted by subjective norm and feasibility appraisal. Negative cognitive valence is negatively predicted by sense of personal autonomy and subjective norm, whereas positive cognitive valence is positively predicted by subjective norm, sense of personal autonomy and feasibility appraisal. Transfer intention is positively predicted by positive cognitive valence and negatively by

negative cognitive valence. Moreover, mandatory versus voluntary participation is a positive predictor of transfer intention, indicating that trainees participating in trainings voluntarily score higher on transfer intention than trainees participating mandatorily. Finally, the interaction term between negative cognitive valence and mandatory versus voluntary participation is also a positive predictor of transfer intention. This indicates that the negative effect of negative cognitive valence on transfer intention is bigger for trainees participating mandatorily in trainings in comparison to trainees participating voluntarily (see Figure 3.3. for the interaction effect). Taken together, our outcomes provide support for most of the assumed relations between the UMTM components, in line with our first hypothesis.

**Figure 3.3.**

*Interaction Effect Between Mandatory and Voluntary Participation and Negative Cognitive Valence on Transfer Intention.*



### 3.3.3. Relationships Between Transfer Intention and Transfer of Training

To answer our second research question, we investigated the value of the UMTM components in predicting transfer of training while controlling for prior knowledge. Our outcomes showed that transfer intention is a positive predictor of transfer of training (see Figure 3.2.). This is in line with our second hypothesis in which we expected that transfer intention would be predictive for transfer of training. Moreover, transfer of training is positively predicted by prior knowledge. In addition,

type of transfer is a negative predictor of transfer of training. This indicates that the association between prior knowledge and transfer intention with transfer is stronger for trainer rated transfer than for external rated transfer. These components together predict 26% of the variance of transfer of training. After removing prior knowledge from the model, transfer intention is not a predictor of transfer of training ( $p = .15$ ) with an explained variance of 9%. This implies that transfer intention is a predictor of transfer of training when we control for prior knowledge. This is in line with our third hypothesis in which we predicted that prior knowledge would improve the accuracy of the association between transfer intention and transfer of training.

### 3.4. Discussion

Previous transfer of training research often measured transfer motivation as a one-dimensional concept and did not take into account that prior knowledge (i.e., pretraining application) affects the association between transfer motivation and transfer of training (i.e., post-training application). Moreover, transfer of training was often measured with self-reports, whereas external-reports can be more objective in detecting transfer of training (Taylor et al., 2009). Therefore, the aim of this study was to get more insight in the predictive value of components of the UMTM, which approaches transfer motivation multidimensionally, for transfer of training rated by external sources, while controlling for prior knowledge. We formulated multiple hypotheses. Firstly, we hypothesized that the included components were related to each other in accordance with the dynamics proposed by the UMTM. Secondly, we expected that the UMTM components positively predict transfer of training. Thirdly, we hypothesized that prior knowledge would improve the accuracy of the association between transfer intention and transfer of training.

#### 3.4.1. The Relationships Between the UMTM Components

Our first aim was to investigate the dynamics of the components of the UMTM. Our results showed that the relationships between the components are mostly in line with the dynamics of the UMTM, which provides support for our first hypothesis. This is in line with previous UMTM research (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018; De Jong et al., 2020). However, for the valences we found some new insights.

More specifically, negative cognitive valence only was a negative predictor of transfer intention when we included whether training participation was mandatory or voluntary. Moreover, trainees participating in trainings voluntarily reported a higher transfer intention than trainees participating mandatorily. In addition, negative cognitive valences seem to be a negative predictor of transfer intention when participation was mandatory, whereas this did not seem to be the case when participation was voluntary. These results are in line with previous research which showed that trainees with a mandatory participation had a lower quality of transfer motivation than trainees participating voluntarily (Curado et al., 2015; Gegenfurtner et al., 2016). As such, our outcomes indicate that negative cognitive valences seem to play a role if specific circumstances, such as a lack of autonomy to decide as to whether one wants to participate in a training or not, are in place. Moreover, our results show that mandatory or voluntary participation in trainings plays a role in the extent to which trainees are motivated to apply training content in practice.

Nevertheless, our results provide insight that both positive and negative cognitive valences have a predictive value for transfer intention, providing evidence that multiple types of transfer motivation matter for transfer intention and eventually transfer of training. This is in line with previous research that employed a multidimensional approach to investigate transfer motivation (Gegenfurtner, 2013; Gegenfurtner & Quesada-Pallarès, 2022). These studies also showed that multiple types of transfer motivation predicted transfer intention and/or transfer of training and that approaching transfer motivation multidimensionally provides more insight in associations between transfer motivation and transfer of training than a one-dimensional approach.

Unexpectedly, we found no effects for affective valences in predicting transfer intention, whereas previous research indicated that positive and negative affective valence also predict readiness for action (De Brabander & Glastra, 2018, 2021; De Brabander & Martens, 2018). The bivariate correlations, however, do indicate that positive and negative affective valence correlate with transfer intention. This could imply that the effect of affective valences on transfer intention is suppressed by negative and positive cognitive valences. This corroborates previous transfer that uses



a multidimensional approach to transfer motivation. These studies also showed that some types of transfer motivation are more important in predicting transfer intention than others (Gegenfurtner, 2013; Gegenfurtner & Quesada-Pallarès, 2022).

Our outcomes could also imply that the affective valences are not unique in predicting transfer intention when negative and positive cognitive valences are included in the analysis. This would contradict the notion of De Brabander and Martens (2014), who theorize that the valences possibly independently predict readiness for action (e.g., transfer intention). To investigate whether this is the case, future research could investigate whether transfer motivation profiles exist in which groups of individuals differ in the configuration of the different valences. It could be investigated (with latent profile analysis, cf. Pastor et al., 2007) whether these different groups also score differently on transfer of training.

#### **3.4.2. The Association Between the UMTM Components and Transfer of Training**

Our outcomes indicate that the components of the UMTM (indirectly) predict external-reported transfer of training when prior knowledge is controlled for. This is in line with our second hypothesis. Moreover, it is in accordance with previous research in which positive associations were found between transfer motivation and external ratings of transfer (Blume et al., 2010; Gegenfurtner, 2011), and with the study of De Jong et al. (2020) in which a self-report measure was used for investigating the predictive value of the UMTM. Our outcomes imply that the intention of trainees to apply training content directly after the training positively predicts the extent that external raters detect the application of training in practice. Moreover, the underlying components of the UMTM can help explain why or why not training content is being used in practice and how application could be improved. That is, enhancing feasibility appraisal, perceived freedom of action, sense of personal autonomy and subjective norm can enhance transfer of training via lowering negative cognitive valence and fostering positive cognitive valence and transfer intention. Together, these outcomes underline the value of the UMTM in predicting transfer of training and that researchers can use the UMTM to investigate how transfer of training can be improved.

Furthermore, our results showed that trainer raters were more positive about transfer than external raters. Moreover, the association between transfer intention and trainer rated transfer was stronger than for external rated transfer. This finding can be explained by the fact that in most trainings the content covered in the training partially depended on the specific learning needs that were indicated by the trainees prior to the training. As a result, trainer raters might have been more familiar with which specific content was covered in the training and what content could have been used in practice than external raters. Trainers raters might therefore have been more positive about transfer, but also more accurate about the rate of transfer. As such, trainer raters might be a better source to indicate transfer than external raters.

### **3.4.3. The Role of Prior Knowledge**

Finally, our results showed that prior knowledge (i.e., pretraining application) was a positive predictor of transfer of training (i.e., post-training application) and improved the accuracy of the association between transfer intention and transfer of training. Without taking prior knowledge into account, we found no association between transfer intention and transfer of training, whereas the inclusion of prior knowledge also increased the amount of explained variance of transfer of training. This is in line with our third hypothesis and in line with the study of Gegenfurtner (2013) who found a correlation between prior knowledge and transfer intention. Our results show that prior knowledge emerges as an important component that can aid the prediction of transfer of training. As such, we recommend future studies to include prior knowledge as a control variable for the association between transfer intention and transfer of training.

Interestingly, the bivariate correlations indicated a positive correlation between prior knowledge and sense of personal competence and a negative correlation between prior knowledge and positive cognitive valence. It therefore seems that prior knowledge not only influences transfer intention and transfer of training, but also antecedents of transfer motivation and transfer motivation. A higher prior knowledge might be a positive predictor of sense of personal competence. This would corroborate with previous research, which indicated that prior knowledge is a positive predictor of self-efficacy (Gurlitt & Renkl, 2010; Ineson et al., 2013). On the other hand, a higher

prior knowledge might negatively predict positive cognitive valence. Pintrich et al. (1993) theorized that a high prior knowledge can increase resistance to learn new and perhaps conflicting knowledge as individuals perceive themselves as already having a high amount of knowledge about the subject. As such, trainees might also not see utility in applying training content when they have much prior knowledge about the subject. It is unclear whether these mechanisms also apply in the transfer of training context. It would be interesting for future research to investigate the predictive value of prior knowledge on other UMTM components. More insight in these mechanisms could aid our understanding about how prior knowledge influences transfer of training.

#### **3.4.4. Limitations and Directions for Future Research**

This study has some limitations. Firstly, ratings by external sources are considered to be more objective in assessing transfer of training (Taylor et al., 2009), it should be noted that they also can be biased. For example, due to expecting positive outcomes of the training (Chiaburu et al., 2010). This could have been the case in our study. Especially trainer raters might have overestimated transfer of training as they assessed on transfer among trainees participating in their own trainings. Future studies could investigate whether trainers raters overestimate transfer of training, for example by investigating whether trainers raters align with subordinates on transfer of training among trainees. Taylor et al. (2009) indicated that ratings of subordinates are the most conservative measure of transfer of training. An overlap between ratings of subordinates and trainer raters would provide evidence that the latter group does not overestimate transfer of training.

Secondly, we chose to measure transfer of training after six weeks to obtain a sufficient response rate and to provide trainees with sufficient opportunities to use training content. However, it is unclear whether trainees remain applying the training content after six weeks and whether the UMTM predicts transfer of training over a longer period of time. Future studies should therefore use a longer time period to see whether the UMTM is predictive for long term transfer of training. For example, transfer of training could be measured six months or one year after training completion (cf. Saks & Burke, 2012)

Thirdly, transfer of training was measured with written documents that were handed in by participants based on one or two occasions after the training on which transfer could have occurred. We requested participants to hand in documents that were representative for their work during this period, but uncertainty remains whether these documents indeed represent the amount of transfer that occurred. To build on our current outcomes, future research could investigate with observations to what extent trainees apply training content in practice (cf. Chiaburu, et al., 2010; Parry & Sinha, 2005) and relate this to the UMTM components.

### **3.4.5. Implications for Training Practice and Organizations**

Based on our results, we have several practical recommendations. We recommend policy makers and trainers to aim at enhancing perceived external support, sense of competence, sense of personal autonomy, perceived freedom of action and subjective norm to enhance transfer motivation and transfer of training among trainees. Sense of personal competence and perceived external support could be improved by integrating a relapse prevention element in trainings that can prevent trainees from falling back in old patterns through identifying potential pitfalls in applying training content. As a result, trainees can feel more competent to apply training content in practice (Rahyuda et al., 2014) and it can help trainees to work around potential limitations in the available equipment or expertise among colleagues to apply training content (Burke & Baldwin, 1999; Rahyuda et al., 2014). Sense of personal autonomy and perceived freedom of action could be supported by warranting that managers and peers provide meaningful rationales about why applying training content could have utility, provide more choices in applying training content and use non-controlling language when trainees aim at applying training content (Jungert et al., 2020). Subjective norm could be stimulated by ensuring that the social norms within companies do not inhibit trainees from transferring training content. This could be achieved by letting supervisors attend the trainings that trainees go through. As a result, supervisors are more familiar with the content of the training and can ensure that using the training content aligns with the norms of the organisation (Gilpin-Jackson & Bushe, 2007).

Finally, we recommend that policy makers and trainers let trainees participate in trainings voluntarily as mandatory participation has negative effects for the quality of transfer motivation. As mandatory participation is sometimes inevitable, it is important to provide trainees with autonomy in their training participation (Salamon et al., 2021). For example, trainees could be given the freedom to choose what point in time they would like to attend a training or could be granted autonomy in which specific training they want to participate (Gegenfurtner et al., 2016). This can soften the adverse effects of a mandatory participation in trainings (Salamon et al., 2021).

To sum up. Our study has provided more insight in the predictive value of the UMTM in predicting transfer of training as assessed by external sources while taking the multidimensionality of transfer motivation into account. In addition, our study underlines the value of including prior knowledge in predicting transfer of training and how mandatory participation in training affects transfer motivation. Based on the implications derived from our outcomes, this study has provided a further step in ensuring that employee trainings have their intended impact on work practice.