ENCODING OF AND MEMORY FOR EXPECTANCY CONGRUENT AND INCONGRUENT INFORMATION

Structural and process characteristics

Dissertation
zur Erlangung des akademischen Grades
doctor philosophiae (Dr. phil.)

vorgelegt dem Rat der Fakultät
für Sozial- und Verhaltenswissenschaften
der Friedrich-Schiller-Universität Jena
von Dipl.-Psych. Sven Oelsner
geboren am 25.06.1975 in Naumburg / Saale

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Tag des Kolloquiums: 12. Februar 2010

Dimidium facti, qui coepit, habet: sapere aude, incipe.

Horaz

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1 Introduction

In social cognition stereotyping is investigated from metaphorical, structural and procedural perspectives. Lippmann (1998, p. 73) described stereotypes metaphorically as

> *"*an ordered, more or less consistent picture of the world, to which our habits, our tastes, our capacities, our comforts and our hopes have adjusted themselves. They may not be a complete picture of the world, but they are a picture of a possible world to which we are adapted. In that world people and things have their well-known places, and do certain expected things. We feel at home there. We fit in. We are members. We know the way around. There we find the charm of the familiar, the normal, the dependable; its grooves and shapes are where we are accustomed to find them. And though we have abandoned much that might have tempted us before we creased ourselves into that mould, once we are firmly in, it fits as snugly as an old shoe."

Recent social psychological research confirms the first phenomenological description of stereotypes by Lippmann predominantly in describing them now as beliefs about the connections of attributes with categories (Allport, 1954; Bodenhausen & Macrae, 1998; Stangor, 2000) or mental representations with associative structures containing nodes for category labels, prototypical group members, exemplars and other nodes for the attributes (Bless, Fiedler, & Strack, 2004) of groups or individuals, such as traits (Macrae, Stangor, & Milne, 1994) and typical behaviours (van Knippenberg & Dijksterhuis, 2000). Other procedural definitions understand stereotypes as "energy-saving devices" (Macrae, Milne, & Bodenhausen, 1994; see Macrae & Bodenhausen, 2001, for a review), as cognitive "tools that jump out of the toolbox when there is a job to be done" (Gilbert & Hixon, 1991) or a "knife that cuts both ways" because it inhibits access to inconsistent information and facilitates the access to consistent information (Dijksterhuis & van Knippenberg, 1996). In short, stereotypes are considered as a flexible tool for handling the incomprehensible information amount in the real world, particularly when cognitive resources are depleted (e.g. Sherman, Lee, Bessenoff, & Frost, 1998), inter alia because meta-analyses (Rojahn & Pettigrew, 1992; Stangor & McMillan, 1992) and relevant investigations found advantages for inconsistent

information in memory under certain circumstances particularly under conditions of cognitive load (e.g. Sherman, Conrey, & Groom, 2004; Ehrenberg & Klauer, 2005).

Despite the high amount of elaborate theories, models, and experimental findings in stereotyping research the crucial question why the perception of stereotype-inconsistent information does not challenge a stereotype is not yet answered. Why is a belief, or conviction about the relation between categories and attributes so strong that a general schema is not altered even in the face of a huge amount of disproving evidence? One way to understand this phenomenon is the investigation of the encoding and memory processes for expectancy incongruent information.

Reasons that why exposition to stereotype-inconsistent information does not lead to immediate stereotype change may be found in several antecedents and characteristics of the perception process for inconsistent information. Different amounts of cognitive capacity, the nature and variety of the stereotype-consistent and inconsistent information, and processing instructions are promising fields for the investigation of process characteristics (Rojahn & Pettigrew, 1992; Stangor & McMillan, 1992).

Influential impression formation models (Brewer, 1988; Fiske & Neuberg, 1990) assume increased individuation as a consequence of continued individual impression formation and less reliance on categorical-stereotypical schemas in cases where motivational or informational reasons make it worthwhile to carry on with the individual impression formation process. However, there is next to no direct investigation of the time course of stereotyping and its potential dissipation with enhanced individuation so far (Kunda, Davies, Adams, & Spencer, 2002).

Furthermore, in these theories it is assumed that individuation is a very resource consuming process which is abandoned under conditions of scarce cognitive resources or lack of motivation – hence supporting stereotyping. On the other hand there are also studies which report no influence of cognitive load on the social categorisation process whatsoever (Nolan, Haslam, Spears, & Oakes, 1999) and rather propose a flexible encoding strategy adapted to varying mental resources. In studies concerning the encoding flexibility hypothesis (Sherman et al., 1998) it was assumed and found (Sherman et al., 2004) that under conditions of scarce cognitive resources the conceptual encoding of consistent information is enhanced whereas perceptual encoding is shifted towards contextual details of inconsistent information (Ehrenberg & Klauer, 2005; Wigboldus, Sherman, Franzese, & van Knippenberg, 2004).

If cognitive load does *not* necessarily lead to more stereotyping in general and consequentially *not* to the ignorance of stereotype-inconsistent information and its contextual

details – then why does stereotype-inconsistent information not change the stereotype? One answer may be recategorisation as permanent update of expectations in the face of poorly fitting behavioural information within a social category during an impression formation process. In the sense a stereotype is not a useful "tool", that is abandoned if not needed, but rather an inevitable prerequisite of information processing. Furthermore, the alteration of the stereotyping process itself does not so much depend on the stereotype that has to be changed but on the variety of stereotype relevant information and the ability to shift from one stereotypical expectation to another.

The present study attempts to show that an initial difference in memory for perceptual details of stereotype-consistent and inconsistent information is diminished during the impression formation process, even under cognitive load, as a consequence of expectation adaptation processes.

Four experiments will be presented that investigated the encoding, memory, and time course for stereotype-consistent and inconsistent information under cognitive load conditions. All participants were presented with equal numbers of consistent, inconsistent, and neutral behaviour descriptions about stereotypically labelled target persons (physician and/or prostitute). The results support the assumption that the presentation of contextual details together with inconsistent information under conditions of cognitive load leads to a memory advantage for these contextual details. The initial disadvantage for consistent contextual information compared to inconsistent information is mostly diminished in the last phase of the impression formation process. The relevance of these findings for approaches concerning change of beliefs will be discussed concludingly.

2 Structural components of stereotyping

2.1 Schema based impression formation: stereotypes and stereotyping

The theories, models and experimental evidence in favour of stereotype-based encoding, processing, memory, and judgement of information are numerous. Early theoretical assumptions proposed a *cognitive miser* in processing stereotypical information (Fiske & Taylor, 1984), meaning a perceiver with the motivation to prevent any inconvenient changes within its cognitive system. But empirical evidence for advantages of inconsistent information and the theoretical necessity of an adaptive strategy of the cognitive system inspired later researchers to coin metaphors such as "strategic tactician" (Fiske & Taylor, 1991), "efficiency expert" or "energy-saving devices" regarding more flexible encoding and retrieval processes (Macrae et al., 1994; see: Macrae & Bodenhausen, 2001 for a review). The development of a differentiated view on stereotype-consistent and inconsistent information was accompanied by several studies using special cognitive load manipulation (i.e. Bodenhausen, 1990; Bodenhausen & Lichtenstein, 1987; Gilbert & Hixon, 1991; van Knippenberg, Dijksterhuis, & Vermeulen, 1999; Macrae et al., 1994; Sherman et al., 1998; see also: Nolan et al., 1999 for a review) with the attempt to discard advantages for inconsistent information and to show that the encoding, processing, and retrieval of inconsistent information is a resource consuming process.

These studies underlined the assumption that under cognitive load participants were more inclined towards perception, memory and judgement of stereotype-consistent information and these results led to the belief that stereotypes are cognitive "tools that jump out of the toolbox when there is a job to be done" as (Gilbert & Hixon, 1991, p. 510) stated.

Stereotyping in these studies was understood as a collective term for several aspects of processing advantages for stereotype-consistent information. Among these were for instance facilitation of concurrent tasks while perceiving stereotype-consistent information (Macrae et al., 1994), as better memory for consistent information (Dijksterhuis & van Knippenberg, 1995; Macrae, Hewstone, & Griffiths, 1993), the variability of judgement of a defendant's guilt according to his or her membership in an inauspiciously stereotyped group (van Knippenberg, Dijksterhuis, & Vermeulen, 1999; Bodenhausen & Lichtenstein, 1987). Some of these and their own findings led Dijksterhuis and Knippenberg (1996) to state that a stereotype is a "knife that cuts both ways" because it inhibits access to inconsistent traits and facilitates the access to consistent *traits*. This hypothesis is further supported by studies

concerning spontaneous trait inferences (Wigboldus et al., 2004; Wigboldus, Dijksterhuis, & van Knippenberg, 2003). These studies found that while observing a behaviour (or rather, by reading a certain behaviour description) a trait is spontaneously inferred. This spontaneous trait inference has been shown to become inhibited if an inconsistent stereotypical category label was presented previously by Wigboldus and colleagues (2003).

However, despite all the facts in favour of stereotype-consistent information processing, a niche was left for processing advantages of inconsistent information. It is to some extend ironic, that these advantages for inconsistent information can be found especially under cognitive load conditions (see Sherman et al., 1998).

2.2 Memory for inconsistent information and cognitive capacity

Findings of investigations concerning advantages for stereotype-inconsistent information (Vonk & van Knippenberg, 1995; Srull, 1981; Belmore & Hubbard, 1987; Higgins & Bargh, 1987; Hamilton & Sherman, 1994; Srull, Lichtenstein, & Rothbart, 1985; Stangor & Duan, 1991; Wyer & Gordon, 1982) gain additional support from meta-analytical studies concerned with memory for expectancy congruent and incongruent information (Rojahn & Pettigrew, 1992; Stangor & McMillan, 1992). These meta-analyses illustrate how expectancy-incongruent information tends to be better remembered. However, they revealed several accompanying conditions: The inconsistency advantage is more likely to occur if an impression formation task – as opposed to a memory task – is introduced and if recognition memory measures were cleansed of guessing biases. Moreover, a retention interval, behaviour descriptions instead of traits, and less cognitive load (reduced information complexity and time pressure) further support substantially better memory for inconsistent information.

Most of the existing theories regarding categorization, stereotyping, and schematizing understand the encoding of information as resource consuming process (Norman & Bobrow, 1975), which typically benefits consistent information because inconsistent information requires deeper processing to be remembered (Macrae, Bodenhausen, Schloerscheidt, & Milne, 1999; Brewer, 1988; Fiske, Lin, & Neuberg, 1999; Garcia-Marques & Hamilton, 1996; Hastie & Kumar, 1979). Consequently, further investigations found better memory for consistent information under conditions of cognitive load (Pendry & Macrae, 1999; Macrae et al., 1999; Dijksterhuis & van Knippenberg, 1995; van Knippenberg, Dijksterhuis, & Vermeulen, 1999; Macrae et al., 1993) seemingly supporting the *cognitive-miser*-assumption (Fiske & Taylor, 1984; Sherman, Macrae, & Bodenhausen, 2000).

An opposing perspective on stereotypical information processing is proposed by representatives of the *meaning-seeker*-assumption (Nolan et al., 1999; Oakes & Turner, 1990; Spears & Haslam, 1997; Oakes, Haslam, & Turner, 1994). Categorization and stereotyping are not seen as tools, more or less at hand in order to save scarce cognitive resources, but as a necessary prerequisite of social perception, memory and judgement. In this argument, stereotyping is understood as a function of the accessibility of particular categories and the fit of the given information with the category. Social perceivers on the other hand are considered as guided by their desire to be as accurate as possible in their perceptions rather than being most efficient. One important prediction resulting from these assumptions is the desire to make sense and find meaning, which trumps the desire to save cognitive resources in general.

Nolan and colleagues (Nolan et al., 1999) explicitly discussed alternative explanations of the effects relying on a "sense making device" instead of an "energy-saving device" concept (Macrae et al., 1999). Also referring to previous arguments by Oakes and Turner (1990; Oakes et al., 1994) Nolan and colleagues explain the reduction of the amount of information intake not as the primary function of stereotyping but as a side effect, which is understood as quite redundant. Nolan and colleagues argue that it is not the information overload that is so challenging for the social perceiver but the ambiguousness and equivocality of the social world. From their perspective the social perceiver mainly aims at establishing socially accurate mental representations of the world instead of trying to be more cognitively efficient. After pointed criticism of the common experimental paradigm in the assessment of stereotype consistency advantages under scarce cognitive resources - the presentation of stereotype-consistent and inconsistent information and the subsequent test of different memory advantages – Nolan and colleagues elaborated on their use of the well tested "Who said what?" category confusion task (Taylor, Fiske, Etcoff, & Ruderman, 1978), where participants have to form impressions of people engaged in a group discussion and subsequently have to match target names or pictures with behaviour descriptions presented on the stimulus tape recording. More intra-category errors than inter-category errors are considered an indication for stronger stereotyping. As expected, Nolan (1999) found no load effects or even opposite load effects on category errors, that is to say under conditions of cognitive load categorization decreased.

Additionally, Klauer and Wegener (1998) and Klauer and Ehrenberg (2005) also illustrated that categorization in the "Who said what?" paradigm is largely unaffected by cognitive load, which could be interpreted as further support for the *meaning-seeker*-assumption.

2.3 A cognitive miser seeking meaning?

From what has been said so far two crucial questions inevitably arise: What exactly is stereotyping? Is stereotyping the motivation-dependent application of a flexible resource keeping tool or is it an unavoidable but adaptive category-based impression formation necessity?

Some aspects of the persistent argument between the two main traditions explaining stereotyping may be based on a confusion of terms. On the one hand stereotyping is described as the application of "flexible and efficient tools" (Dijksterhuis & van Knippenberg, 1996; Macrae et al., 1994; Gilbert & Hixon, 1991) – a theory rooted in the *cognitive-miser*-supposition and later on (Fiske & Taylor, 1984) transformed into the *efficiency-experts*-assumption (Macrae & Bodenhausen, 2001; Sherman et al., 2000; Sherman et al., 2004).

On the other hand the *meaning-seeker*-hypothesis (Nolan et al., 1999; Oakes & Turner, 1990; Spears & Haslam, 1997) rooted in the social identity theory (Tajfel & Turner, 1979) was postulated, which implies the particular helpfulness of categorisation and stereotyping in coping with too little rather than too much information (Medin, 1988).

Efficiency experts are understood as equipped with several motivations that lead – depending on the situation – to stereotyping. Cognitive load is considered an interference with effortful, resource-dependent mental processes, such as individuation and inconsistency resolution, and thus supporting stereotyping. This view in no way contradicts the original *cognitive-miser*-assumption, but specifies it (Sherman et al., 2000). While forming impressions of people cognitively very busy perceivers rely on already pre-chewed models of the social world in order to enable them to achieve other than non-resource-saving-goals (Macrae et al., 1994).

There are many *dual process models* of information processing in social and cognitive psychology with the same intention to classify effortful and effortless cognitive procedures and group them into different categories: automatic, associative, heuristic, intuitive, schematic, stereotypic, categorical, experiential, and impulsive thinking vs. systematic, individually, corrective, suppressive, rational, rule-based, and reflective thinking (Epstein, 1991; Fazio, 1986; Strack & Deutsch, 2004; Chaiken, 1980; Devine, 1989; Sloman, 1996; see Smith & DeCoster, 2000; for a review). They all share the assumption of a complex cognitive system that uses flexible adaptive processes.

Does stereotyping imply a shift towards automatic, associative, and heuristic thinking under cognitive load even when there is a lot of motivation for rational rule based, systematic thinking available? However, stereotyping can also occur within a systematic thinking. Stereotypes themselves may not be resource saving tools. There can also be a very systematic, highly elaborated, stereotypical framework that is based on rational, thorough considerations and reflects a set of rules. Consequentially, stereotyping can be seen as a kind of systematic thinking and not opposed to it. Generally speaking, there is a difference between the processes and the contents involved in stereotyping. The contents of cognitive processes, which are themselves very resource consuming and easily depleted by cognitive load (i.e. inconsistency resolution), can be very sophisticated, depending on the degree of experience and previous elaboration. On the other hand inconsistency resolution and individuation can be less resource consuming depending on the ability to shift the stereotypical frame, on the amount of available alternative opportunities and the training experience in inconsistency resolution and individuation.

Therefore, *meaning seekers* can be understood as functioning according to their primary motivation to create understanding. Stereotyping can be seen as a similarly effortful process as individuation, which is included in the assumption that categorization is an inevitable component of human information processing (Spears & Haslam, 1997). In contrast to the continuum model (Fiske & Neuberg, 1990) – which implies less categorisation at some level – it could be stated that all perception and cognition is categorical, which follows ideas developed by no other than the philosophical giant Immanuel Kant.

In their review of the debate between *efficiency experts* and *meaning seekers* Sherman, Macrae, and Bodenhausen (2000) clarified their view on the dispute: That – from their perspective – there is no dispute. Nevertheless, their views on social perception resulted in the formula "systematic thinking = f (motivation x capacity)" (Bodenhausen, Macrae, & Sherman, 1999, p. 276). Spears and Haslam (1997) as well as Oakes and Turner (1990) did not put it less bluntly: According to them stereotyping is a cognitive operation that creates meaning in the ongoing *process* of social reality computing and not a flexible process of applying simplifying, pre-established structures in order to save cognitive capacity. Spears and Haslam found no persuasive evidence supporting the *cognitive-miser*-assumption. Even large scale manipulation of cognitive load does not necessarily imply that a lack of capacity results in less systematic thinking. Consequentially, the above formula may be restated as "systematic thinking = f (motivation + capacity)".

Furthermore, Gilbert and Hixon (1991) contributed to this discussion by reporting evidence suggesting that – firstly – automaticity of stereotype *activation* is impeded by cognitive load and – secondly – that stereotype application – once the stereotype is activated – is facilitated. The "Who said what" paradigm, used by the *meaning-seeker*-attorneys Nolan and colleagues (1999), is a method highly suitable for the investigation of the spontaneous activation and subsequent application of social categories to a group of different people belonging to different primary social categories. On the other hand, the stereotype-priming-paradigm, used by *efficiency-experts*-representatives like Macrae and colleagues (Macrae et al., 1994), is very useful for the investigation of the application of previously primed stereotypical labels to subsequent behavioural information of single target person. This paradigm is also known for its facilitation of memory for stereotype-consistent information. Both assumptions (*meaning seeker* vs. *efficiency experts)* are general hypotheses and not restricted to special paradigms of investigation ("Who said what" paradigm vs. stereotype-priming-paradigm). If the *meaning-seeker*-assumption is valid, then the assumption that social categorisation is primarily motivated by the fit of behaviour and social category (and not by cognitive load) must also apply to paradigms with previously primed stereotypes. If – on the contrary – the perceiver is an *efficiency expert*, cognitive load should be a major force behind inhibition of any recategorisation or individuation attempts.

2.4 The encoding flexibility model (EFM)

Another solution for the contradictory findings of the memory advantage for inconsistent information, both under cognitive load and no load lies in dynamical processes that favour memory for consistent *and* inconsistent information under cognitive load alike. Sherman and colleagues (Sherman et al., 1998, p. 591) argued that "the efficiency of stereotypes lies in their ability to facilitate, in different ways, the encoding of both, expected and unexpected behaviours when capacity is low" and that "as processing capacity is depleted, consistent information enjoys relatively greater conceptual encoding than inconsistent information. At the same time, attention and perceptual/contextual encoding (encoding of the physical details and contextual specifics of the stimulus) shift away from consistent and toward inconsistent information." (Sherman et al., 2004, p. 216; see also: Sherman, 2001).

In a series of experiments Sherman and colleagues (1998) tested these assumptions. They presented their participants with the same amount of stereotype-consistent, stereotype-

inconsistent, and neutral behaviour descriptions about one of two stereotyped target persons, a skinhead or a priest. They were able to show that reading times for inconsistent items were significantly longer under conditions of cognitive load and response frequencies to tones emitted during the presentation of consistent and inconsistent behaviours were higher for inconsistent items than for consistent items under load, but not so in low load conditions. All in all this indicates greater attention achievement for inconsistent information (or less for consistent information) with limited cognitive resources. Moreover, they found a better memory for inconsistent items if consistent and inconsistent items directly competed with each other for attention because of their simultaneous presentation under load. These results were interpreted as supporting the attention shift assumption. Sherman et al. argue that experimental constraints prohibit the usage of explicit measures with expectancy tasks because of suspected intentional, expectancy-based reconstruction processes as a consequence of the conceptual "*contamination*" of the material. Consequently, Sherman and colleagues carried out a perceptual priming task, where briefly flashed stereotype-consistent and inconsistent words – previously presented on a list of behaviour descriptions – had to be identified. They found better identification results for inconsistent information, which was interpreted as support for the assumption that inconsistent information receives more perceptual encoding. That this inconsistency advantage in word identification also held true for the no load condition was illustrated with findings of generally less affectability of perceptual encoding by cognitive load. In a final trait recognition task Sherman et al. found higher identification of consistent traits related to behaviour descriptions perceived in the presentation phase. Sherman and colleagues took these results again as support for their hypothesis of conceptual fluency and attention flexibility.

In a revisit (Sherman et al., 2004) of the study by Sherman et al. (1998) a significantly enhanced selection of inconsistent probe items compared to consistent probe items under conditions of low cognitive capacity was found. With sufficient resources available the effect was inverted: Consistent probe items were chosen significantly more often than perceptually comparable ones. Sherman et al. used a recognition task, where participants had to identify graphemically similar words to words shown in the presentation phase. These probe words were conceptually unrelated to the target words which were presented in sentences like "Didn't help the short lady reach for an item on the top of the shelf". Then the word "shell" being similar to the word shelf, had to be identified from a list of 50 probe words. The target sentences were presented on the left and the right hand side of the screen in a combinations of 12 pairs of behaviour descriptions (consistent/inconsistent (4) consistent/irrelevant (4) and

inconsistent/irrelevant (4)). All pairs of behaviour descriptions were shown in a short presentation interval (3 seconds) in order to provoke direct attention competition between consistent and inconsistent items. The priming procedures used by Sherman and colleagues allow the investigation of short-term-attention reallocation processes, but not the examination of episodic long-term memory, where the physical details and contextual specifics of the stimulus are expected to be encoded, as well.

Support for the conceptual part of the EFM also comes from research concerning spontaneous trait inferences (STI), where these inferences for stereotype-inconsistent information were particularly impaired by cognitive load (Wigboldus et al., 2003; Wigboldus et al., 2004). This is of special interest because recent research in STI shows that the trait inference process is neither enhanced nor depleted by changing cognitive capacity, but is an almost inevitable component of impression formation (Crawford, Skowronski, Stiff, & Scherer, 2007; see also Winter, Uleman, & Cunniff, 1985). Wigboldus and colleagues (2004) presented their participants with trait-implying behavioural descriptions such as "X hits the saleswoman" that were either consistent or inconsistent with a particular stereotype previously presented. After reading the sentence, participants were presented with trait probe words ("aggressive") and instructed to indicate as fast and precisely as possible whether the exact word had been presented before. On average half of the participants who were placed under cognitive load needed on average more time to reject consistent trait probe words than inconsistent trait words. This result was interpreted as facilitation of spontaneous trait inferences with the aid of stereotypes under cognitive load. Within the framework of the EFM these results indicate the accuracy of the assumption that stereotype-consistent information is processed in a more conceptual manner than inconsistent information.

Further evidence for the EFM provides a study by Ehrenberg and Klauer (2005). In a source monitoring task they presented their participants with the same amount of consistent, inconsistent and neutral information about two oppositely stereotyped target persons. The information given combined each behaviour description with a photo of one of both target persons. After this presentation participants were instructed to decide whether one particular behaviour description had previously been shown to them or not. If they decided that the target item was "old", participants then had to match the behaviour description to one of both target persons. Ehrenberg and Klauer (2005) observed a profound memory advantage for the target person when it was presented together with inconsistent information as compared to presentation with consistent information under cognitive load. Their results somewhat contradict the findings by Macrae and colleagues concerning individuation under load

(Macrae et al., 1999). Macrae and colleagues explained their finding for better memory for the source of a trait as indication for a resource consuming individuation process that will be depleted under conditions of scarce cognitive resources. It is noteworthy, traits have been shown as facilitating memory for consistent information (Stangor & McMillan, 1992).

Additionally, Ehrenberg and Klauer documented a substantial memory for the source of stereotype-inconsistent information, particularly after a 30 minutes retention interval, suggesting an encoding of contextual details into episodic long term memory. Despite the role a perceptual or contextual detail might play, the photo of a target person is possibly conceptually "contaminated". That means that a photo is not purely perceptual information but rather functions as reference for the consistent and inconsistent information and might therefore become important in the expectancy-based recollection processes. Therefore it is worthwhile to develop an extension of the behavioural descriptions used by Ehrenberg and Klauer to include irrelevant information such as letter colour or screen position of the behavioural description as source information.

3 Procedural components of stereotyping

3.1 Individuation and inconsistency resolution

The advantage for inconsistent information in memory is often described as a consequence of deeper processing (Srull & Wyer, 1989; Craik & Lockhart, 1972; Hastie, 1981; Hastie & Kumar, 1979) which is very resource-consuming (Hastie, 1981; Brewer, 1988; Fiske & Neuberg, 1990) and therefore depleted under conditions of cognitive load (Hilton & von Hippel, 1996; Macrae et al., 1999). This "deeper processing" is either understood as *inconsistency resolution*, where perceivers try to explain and meld the inconsistent information with their stereotypic anticipation (Sherman & Hamilton, 1994; Hastie, 1981; Hilton & von Hippel, 1996; Hutter & Crisp, 2005; Macrae et al., 1999; Srull & Wyer, 1989), or as the individual organization of perceived impressions directly linked to the target person, called *individuation* (Brewer, 1988; Fiske & Neuberg, 1990; Macrae et al., 1999).

This has noteworthy implications about the potential of deeper processing to change a stereotype. If inconsistency resolution and individuation processes taking place in an impression formation act, the whole impression of the particular person might change during the perception and processing of the behaviour descriptions (or, in the real world, of some sort of behaviour). In case the impression of an individual changes, the stereotypical anticipation of forthcoming behaviour should also change. Consequently, processing of incoming information becomes less guided by preceding stereotypes or prior knowledge of stereotypically consistent behaviour and therefore the inconsistency advantage/consistency disadvantage in memory should disappear (Kunda et al., 2002; Kunda, Davies, Hoshino-Browne, & Jordan, 2003).

Traditionally, it is argued that with weak or absent individuating information stereotyping (expectancy) is strong and with an increasing amount of individuating information available the stereotyping is reduced (see Brewer, 1996; for a discussion). It is assumed furthermore, that if individuating information achieves a particular magnitude the process of stereotyping accelerates anew, because through the increasing amount of information cognitive capacity is reduced and category based impressions are preferred again.

The processes of inconsistency resolution and individuation concerning a single person during an extended impression formation process, could then lead to weaker stereotypical expectancies regarding the expected behaviour of a target person. These

considerations give rise to the assumption that the individuation and inconsistency resolution processes are impaired by additional cognitive load, which is not necessarily information-magnitude-dependent.

3.2 Tests and extensions

Macrae et al. (1999) predicted and found an impaired *inconsistency resolution* by a concurrent strategic-executive-task. Recollection memory for inconsistent information was diminished under conditions of cognitive load. That the process of *individuation* was diminished by the executive demand was condensed in lower source memory (memory for the particular target person) for inconsistent information. The usage of the term "individuation" here and elsewhere requires some extra attention: Individuation is usually understood as the change of an impression through increased accumulation of information pieces concerning a person. However the investigation of individuation procedures by Macrae and colleagues elaborates on better memory for one person or another using only a single measure of competing memory quality. This is more of a differentiation ability measure than an assessment of individual impression formation changes. Nonetheless, the ability to differentiate between variable pieces of information concerning two targets previously categorised depends on cognitive load, subsequently indicating that category-based perceptions are enhanced by scarce cognitive resources.

Following the approach by Macrae et al. (1999) source memory for consistent information in a person perception process, should initially be greater than source memory for inconsistent information under load. The increasing amount of information about an individual target person should affect memory capacity and processing of both consistent and inconsistent information within an ongoing impression formation process. Because of the category based impression formation especially memory for consistent information is expected to improve and the difference between consistent and inconsistent information should become more pronounced. The process described can be called "vertical" individuation that focuses on single pieces of information. This kind of single-piece-of-information-individuation is understood by Macrae et al. as hampered by cognitive load.

An additional concern has to be included by the *depth-of-processing-model* (Hastie & Kumar, 1979) that binds the necessity of deeper processing on the novelty value of perceived information. The novelty value itself is influenced by serial position of the item, the number of similar previous behaviours, and the degree of incongruence with the current trait

impression. Hastie and Kumar presented their participants with different proportions of inconsistent items at different positions in the presentation process and found a characteristic pattern of serial position curves for the recall of inconsistent information compared to consistent information. A proportion of 1-3 inconsistent in a total presentation of 14 items (all others being consistent) were substantially better remembered than consistent information, a proportion of 5-7 incongruent of 14 items led to a diminishing memory for inconsistent information over the presentation phase.

It can be hypothesized that with an increasing amount of individuating information the higher novelty value advantage for inconsistent information is reduced during the impression formation process. At the end of the process a decreasing memory also for perceptual/ contextual details of inconsistent information remains. Hastie and Kumar found overlapping courses of the memory graphs for consistent and inconsistent information at the end of the impression formation process.

3.3 Stereotyping as continuously adapted permanent anticipation

Stereotyping is by definition a process. The assumption that a primed stereotype is dissipating with time and space between information pieces is widely acknowledged and recognized in *spreading-activation* and *depth-of-processing-models* (Anderson, 1983; McClelland & Rumelhart, 1986; Hastie & Kumar, 1979; Craik & Lockhart, 1972). Even though the definition of stereotyping as a process is undisputedly accepted, its investigation as a process coverings a certain time span is widely neglected and is to date - with remarkable exceptions - practically non-existent (for a critical review see: Kunda et al., 2002; Kunda et al., 2003).

Typically, experiments in person perception with cognitive load manipulations use a design that presents the same amount of stereotype-consistent and inconsistent items to the participants, asking them to form impressions of the target persons. During the procedure they are exposed to cognitive load and subsequently asked to remember the behaviour descriptions, traits or sources of the presented behaviours. Usually, the data is analyzed en bloc, i.e. the encoding procedure and memory for a stereotype-inconsistent item in the beginning of the impression formation process were the same as for an item in the end of the encoding process.

But stereotyping – including the sub-processes of stereotype activation and application – are better be described in terms of a process of continuously adapted permanent

anticipation. Effects of a different encoding of stereotype- or *expectancy*(!) consistent and inconsistent information, such as mentioned above (Hastie & Kumar, 1979; Rojahn & Pettigrew, 1992; Stangor & McMillan, 1992) show that information intake is always preceded by a certain expectation. The fit of incoming information and the categorical expectation influence the use of further application of more or less accessible stereotypical schemas (Nolan et al., 1999; Klauer & Wegener, 1998). In addition, stereotyping can be understood as continuous adaptation to the ever changing social reality of perceivers, who are motivated to construct a coherent picture of their social surroundings (Spears & Haslam, 1997). One of the social/psychological theories describing the continuous adaptation of the categorization/stereotyping process in progress is the *continuum model* developed by Fiske and Neuberg (1990; see Figure 1). This model describes the recategorisation processes if the available information does not fit the applied stereotypical expectations.

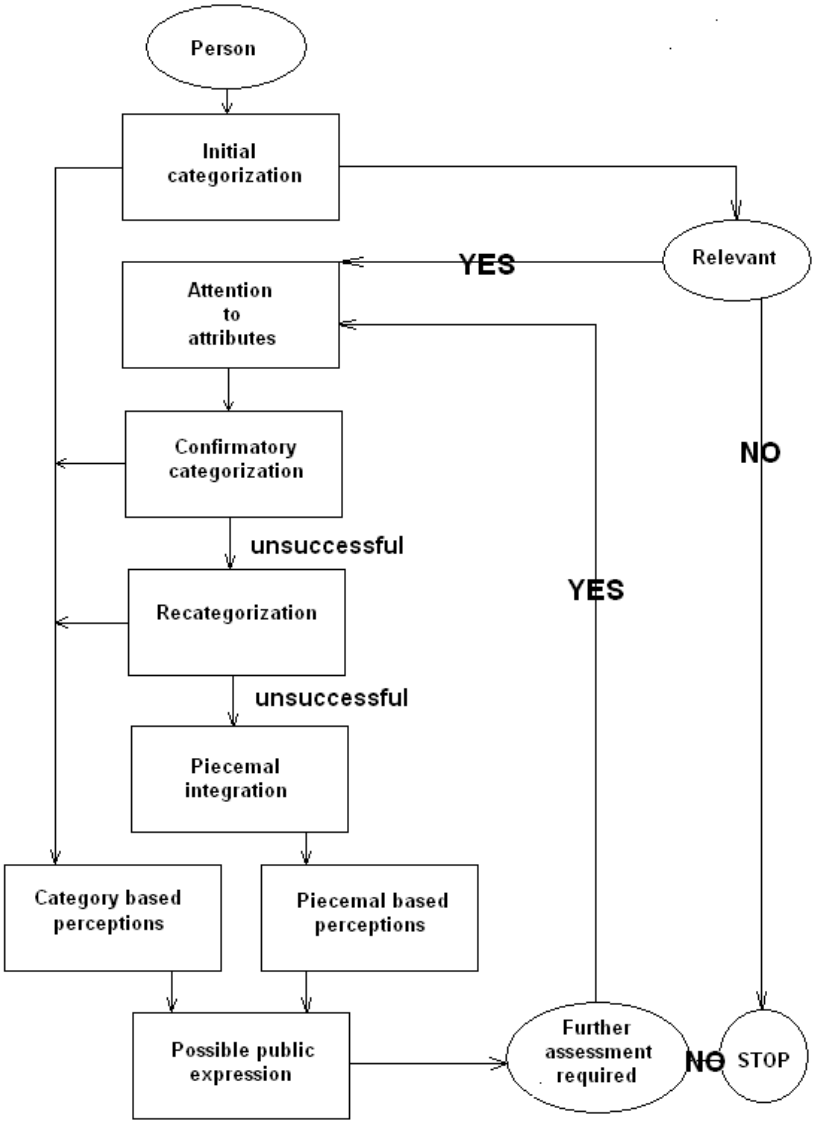

Figure 1. The continuum model of impression formation according to Fiske and Neuberg (1990)

Findings in favour of an adjustable categorization as a consequence of disconfirming exemplars or behaviour were provided by Kunda (1995), Macrae (1999) and in numerous findings of effects of subtyping due to confrontation with ill-fitting exemplars. Subtyping – reassigning exemplars to sub-categories – is described as an effortful causal reasoning process (Kunda & Oleson, 1995) and as depleted under conditions of cognitive load (Yzerbyt, Coull, & Rocher, 1999). Moreover, the effort in subtyping, depleted by cognitive load, is moderated by social identity enhancement motivations (Coull, Yzerbyt, Castano, Paladino, & Leemans, 2001). The causal reasoning process as a consequence of the combination of social concepts, that appear to be mutually exclusive, is described as leading to "emergent attributes" (Kunda, Miller, & Claire, 1990; Hastie, Schroeder, & Weber, 1990). Hastie and colleagues explained their results emerging attributes in terms of a "selective modification model" developed by Smith, Osherson, Rips, & Keane (1988). This model assumes a frame structure in long term memory where social categories are represented with slots corresponding to typical characteristics of members of the particular group and allowing some kind of softly constrained variability. At some point in the perception process the discrepancy between the available information and the activated frame in long term memory is presumably so strong that the frame application is modified or disrupted. In a second stage, a complex explanation for the discrepant attributes is sought by causal reasoning. Here, memory search is a frequently described solution (Kunda et al., 1990; Hutter & Crisp, 2008). Furthermore, load effects on the production of emergent attributes as inconsistency resolution are reported (Hutter & Crisp, 2006). However, another crucial process may be employed under conditions of cognitive load:

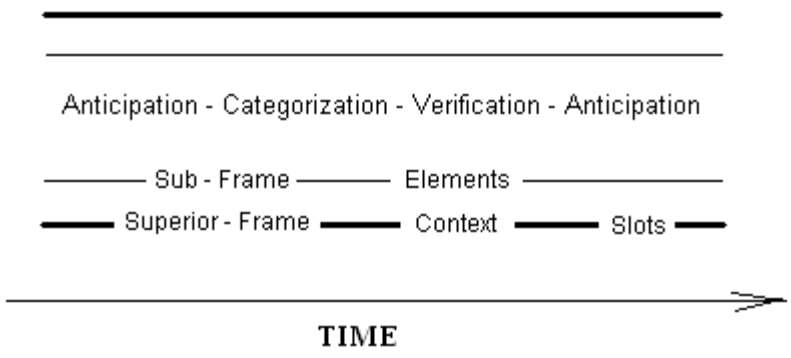

Figure 2. Model of a schema based person perception process as continuously adapted anticipation with a conceptual subframe (psychological) and a superior perceptual frame (physical context or memory).

The third component of a stereotyping process, which requires attention, is the context reference of the interrupted stereotyping. Recently, Deutsch and Fazio (2008) presented

findings of perceivers shifting their attention towards features that facilitate the discrimination between stereotype confirming and disconfirming exemplars. Förster and colleagues (Förster, Higgins, & Strack, 2000; Förster, Higgins, & Werth, 2004) observed better memory for irrelevant details (background colour) of inconsistent information. Kunda and Oleson (1995) discovered, that stereotypes were less likely to be changed when participants had the opportunity not to generalize but to subtype deviant exemplars by the use of irrelevant attributes. Of particular importance in this field of research are the findings by Sherman and colleagues (Sherman et al., 2004; Sherman et al., 1998) who discovered enhanced memory for perceptual details of inconsistent information under cognitive load conditions (please refer to paragraph 2.4).

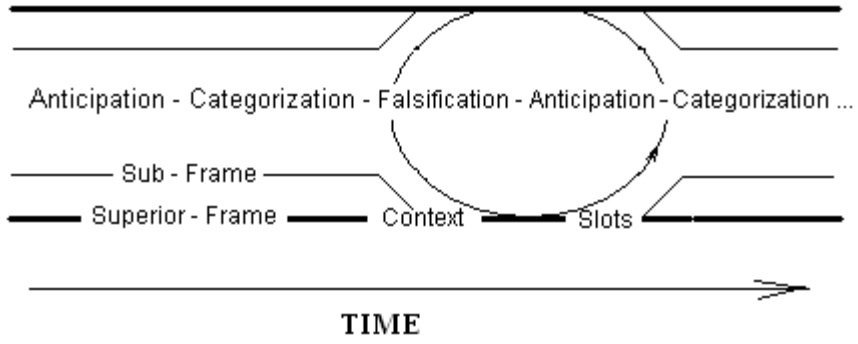

Figure 3. Model of a schema based person perception process as continuously adapted anticipation with a conceptual subframe (psychological) and a superior perceptual frame (physical context or memory) in a adaptation shift as a consequence of the processing of inconsistent information

In sum, it is plausible to specify stereotyping as a continuously adapted, permanent anticipation with substantial reference to a given context (present in memory or in the current surroundings, see Figure 2). Stereotyping as adapted anticipation particularly occurs when expectancy disconfirming information is perceived. Presumably it is driven by an attempt to resolve inconsistencies, i.e. to find reasons for them and hints enabling the perceiver to discriminate relevant information (see Figure 3). Finally, the ultimate goal of this process of continuous adaptation of the ongoing anticipation process is the optimal adjustment to the world.

3.4 Conclusion

In the beginning of this chapter two contrasting views on stereotyping, yet still unresolved in research, were discussed. The first assumes, that a stereotype is a flexible resource-saving tool, whose use can be impaired by cognitive load, while the second claims, that stereotyping is a necessary prerequisite of human information processing largely unaffected by additional processing demands.

The *efficiency-expert* and *meaning-seeker*-assumptions allow for different interpretations. Better encoding of inconsistent information is understood in the broad view of a *cognitive-miser*/ *efficiency-expert* as a consequence of a resource-consuming inconsistency resolution or individuation process (Macrae et al., 1999). Following their argument, cognitive load must lead to worse memory for inconsistent information – and even more so for the sources and contextual details of inconsistent information.

In the frame of their *depth- of-processing-model,* Hastie and Kumar (1979) explained the results of their experiments as consequence of the informational value of items, which is based on the serial position of the item, the number of similar previous behaviours, and the degree of incongruence with the current trait impression. Hastie and Kumar further describe the deeper processing of inconsistent items as a resource-consuming inconsistency resolution and impression change (individuation) process. With reference to Hastie and Kumar, memory should initially be weaker for inconsistent information than for consistent information under cognitive load. Beyond the initial impression, memory advantages are lost together with the informational value of an item. In consequence, the difference between consistent and inconsistent information is expected to rise under cognitive load.

Sherman and colleagues (Sherman et al., 1998; Sherman et al., 2000) argue that stereotypes may be used flexibly at encoding of stereotype-consistent and inconsistent information under cognitive load. Stereotype-consistent information is deeper encoded on a conceptual level whereas inconsistent information is encoded less conceptually but more perceptually for later inspection and integration. The EFM (Sherman et al., 1998; 2004) explains the inconsistency advantage in recognition memory as a consequence of an automatic attention reallocation process based on substantial vigilance mechanisms. Under conditions of scarce cognitive resources, the EFM predicts a shift of processing of perceptual details away from consistent information and towards inconsistent information.

The EFM does not specifically elaborate on the process of continuous person perception, but by interpreting the EFM it is assumed here that the better recognition memory

for sources or irrelevant details of stereotype-inconsistent compared to consistent information under cognitive load is not referable to an individuation or inconsistency resolution processes in favour of inconsistent information but to the impairment of encoding of perceptual/contextual details of *consistent* information because of available heuristic processing strategies such as spontaneous trait inferences (Wigboldus et al., 2003; 2004).

Relying on the explanations provided by the EFM together with theories concerning stereotyping as a process it can be assumed that the source memory is better for inconsistent information in the initial part of the impression formation process. But with the growth of individuating information the initial stereotype label loses its referential value and heuristic processes are replaced by detailed processing facilitating increased source memory also for consistent information.

On the other hand it is plausible to understand stereotyping as a necessary strategic *meaning-seeking*-process, which does not have to be impaired by cognitive load (Nolan et al., 1999; Spears & Haslam, 1997). And even more so, person perception must be understood as an adaptive process of permanent categorisation and stereotyping. Within this dissertation inconsistency resolution and individuation are understood as inevitable adaptation processes, which remain unimpressed by cognitive load and which may lead to the dissipation of the reference stereotype itself (Kunda et al., 2003; Kunda et al., 2002). Stereotype-inconsistent information is not avoided under cognitive load but equally considered or even preferred for building an adequate mental representation. Because of the apparent inconsistencies this leads to a reasoning- or contextual cue-guided recategorisation. Consequentially, memory for inconsistent information is by no means worse than memory for consistent information and initially, the contextual cues are especially noticed for inconsistent information. But this difference for contextual memory for inconsistent and consistent information advantage diminishes with the decreasing fit of stereotypical social category and concrete behaviour.

The EFM and the *meaning-seeker*-hypothesis are to this point comparable in their predictions but they differ on another crucial point, namely automaticity. According to the EFM stronger perceptual encoding under cognitive load is a consequence of an inevitably automatic attention reallocation process. Consequently, better memory for perceptual details makes them accessible for later inspection. The *meaning-seeker*-assumption suggests that the concentration on perceptual details illustrates the attempt to enable a meaningful recategorisation and that the attention focus towards perceptual details is no longer traceable if the perceivers are informed of an arbitrary character of the context information.

4 The role of encoding flexibility in search for meaning

4.1 Main Hypotheses

4.1.1 Hypothesis concerning the memory for perceptual details of inconsistent information

It is predicted that with less cognitive capacity (more cognitive load) the memory for irrelevant perceptual details of stereotype-inconsistent information is enhanced in comparison to the memory for perceptual details of stereotype-consistent information.

4.1.2 Hypothesis concerning the diminishing of the inconsistency effect

It is predicted that with an increased amount of stereotype-consistent and inconsistent information the initial memory advantage for perceptual details of inconsistent information under cognitive load will disappear during the impression formation process.

4.1.3 Hypothesis concerning the automaticity of the attention allocation process.

It is predicted that the initial attention directed at contextual details of inconsistent information is omitted, if the context information is described as arbitrary and unconnected to the target person and the behaviour descriptions

4.2 Overview of the experiments

In the 1st experiment the participants were presented with stereotype-consistent and stereotype-inconsistent behaviour descriptions about two female target persons, a prostitute and a physician. Based on the preliminary findings by Sherman and colleagues (1998; 2004), Ehrenberg and Klauer (2005), and the theoretical assumptions of the EFM, I expected to find a better source memory for stereotype-inconsistent behaviour of the target person, if participants were placed under cognitive load. According to the recategorisation assumptions (Fiske & Neuberg, 1990; Kunda et al., 2002; Kunda et al., 2003) it was also expected, to find a significant decline of advantages for stereotype-inconsistent source memory over the presentation phase.

In the 2nd Experiment only behaviour descriptions about one of the target persons were presented on either the left or right side of a screen in order to investigate the encoding sensitivity for semantically unrelated contextual details of stereotype-inconsistent and consistent information. According to the predictions of the EFM (Sherman et al., 1998), I expected better memory for the screen position of inconsistent behaviour descriptions if they were. The results of the experiment were expected to reaffirm the reduction of memory advantages for contextual details of inconsistent information over the presentation phase already observed in the 1st experiment.

In the 3rd experiment participants were presented with both target persons, according to the experimental paradigm by Ehrenberg and Klauer (2005), and with the behaviour descriptions at both screen positions as in Experiment 2. After the presentation they were asked for the target person *and* the screen position to test the assumption of an individuation effect such as assumed by Macrae et al. (1999) vs. the automatic attention reallocation hypothesis as developed by Sherman et al. (1998). And once more the experiment was supposed to show the diminishing of the inconsistency effect.

In the 4th experiment participants were expected to show an automatic attention reallocation reaction, even if directly informed of the upcoming way of presentation on different screen positions and the arbitrary character of the behaviour descriptions. They are expected to show a basic attention reallocation reaction anyway, if the encoding of stereotype-inconsistent information under cognitive load is a non-strategic, perceptual (Sherman et al., 1998) and unintentional process that occurs without perceivers' awareness (Macrae, Milne, & Bodenhausen, 1994). Using the same experimental paradigm as in Experiment 2 participants were informed about the course of the experiment, i.e. they were told that behaviour descriptions would be shown at different screen positions and that this required to focus their attention. In a second condition we informed participants of the fact that the kind of the behaviour description (positive and negative) was unrelated to its screen position.

5 Experiments

5.1 Multinomial Models

To investigate the inconsistency advantage for irrelevant context information under conditions of scarce cognitive resources compared to sufficient resources employed a source-monitoring multinomial model analysis (Batchelder & Riefer, 1990, 1999; Erdfelder & Bredenkamp, 1998; Meiser & Bröder, 2002), which allows the separate assessment of item, source and context memory as well as guessing strategies.

Usually, most studies concerning memory for consistent and inconsistent information are focused on the assessment of item information. But the EFM (Sherman et al., 1998; Sherman et al., 2004) with the assumption of better memory for episodic details of an inconsistent information impression formation and individuation assumption by Macrae et al. (1999) encourage the consideration of methods for the investigation of source monitoring.

In a paradigmatic source discrimination experiment the participants are presented with a certain amount of mixed items from two lists *A* and *B*. After the initial presentation the lists are mixed again and presented with new items added. The participants now have to decide if the item has been presented before or if it is *new*. If the participants decided that the item was *old*, i.e. previously presented, they are asked if the *old* item originates from list *A* or list *B*. If they initially decided that the item was *new*, no decision had to be made for the sources of the items (list *A* or *B*) and another item for the *old/new*-decision was directly presented afterwards. Potential classification options are presented in Table 1.

	Attribution		
Source	A	B	N
A	AA	BA	AN
B	AB	BB	BN
NEW	NA	NB	NN

Table 1. Potential classifications in the source discrimination task

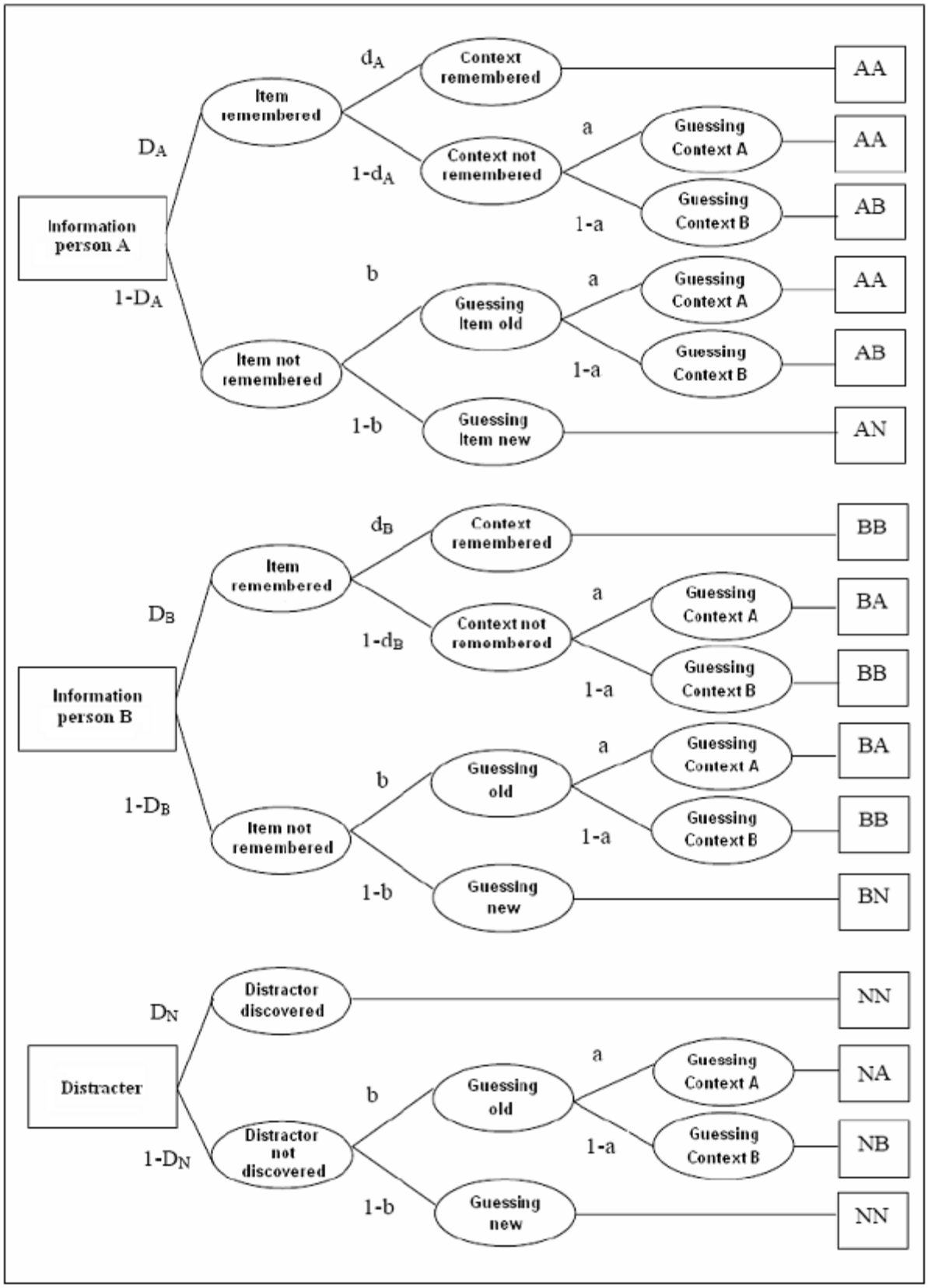

Figure 4. Multinomial model of source discrimination

A previously presented item from list *A* can be incorrectly judged as *new* (*AN*) or as *old* from list *B* (*AB*) or correctly as an *old* item from list *A* (*AA*). The underlying cognitive processes for the binary *old/new*-decision and the source discrimination can be mere guessing or recognition. Based on the fact that perfect memory for larger information amounts is rare, the use of stereotype-based guessing strategies is very likely. The decision hierarchy can be presented in a processing tree of probabilities starting from the origin of the item on the *A-, B-*, or *New*-list along the correct detection, the correct guessing, and the wrong guessing of *old* and *new* items to the correct detection, the correct guessing and the wrong guessing of the origin of the item (see Figure 4.).

In the multinomial model item memory is reflected in the ability of the participants to distinguish between a previously presented item and a distractor item documented in the correct decision between *old* or *new* when a probe item is presented. Participants are able to do that with a certain probability reflected in the model parameter *D*. The probability that the probe item is not remembered is reflected in the directly opposed probability parameter *1-D*. The detection of distractor items is labelled by model parameter *DN* and it reflects the probability of the correct decision for *new* when the distractor item is presented. The opposing probability *1-DN* indicates that the distractor item is not identified.

"Source memory" is the memory for the source or the context of the target item provided that the target item itself has been recognized (correctly or not) as *old*. In multinomial models of source monitoring it can be denoted with the probability *d* and it reflects the detectability of the person the target item was presented about (Ehrenberg & Klauer, 2005) or perceptual details of the target information, such as height and position (Meiser, 2005), or letter colour (Smith & Bayen, 2004). The opposite parameter *1-d* stands for the probability of not detecting the source or details of the item.

Recollection processes can be biased by stereotypical expectations (Macrae, Schloerscheidt, Bodenhausen, & Milne, 2002), familiarity with the items or cognitive load (Ehrenberg & Klauer, 2005). Guessing of an item is reflected by the parameter *b*. If an item or a distractor were not remembered, the item or the distractor can be guessed as *old* or *new*. If an item was not remembered or a distractor not detected, the probability *b* indicates guessing an item or a distractor as *old* whereas the opposite probability *1-b* indicates the classification of an item as distractor or as *new*.

The source or the context of a target item can also be guessed and this is captured by the model parameter *a*. It reflects the decision for one of the alternatives presented with the

target item instead of the original source or context. The probability *1-a* indicates the decision for the other source or context.

The processing trees for both basic sources have the same fundamental structure. Different indices D_A or D_B denote the different original sources. The single parameter values can be estimated with a maximum likelihood method on the basis of empirical answer frequencies in different answer categories by multiplication of the parameters of a tree branch and the addition of the branch products leading to answer categories (for an introduction see Batchelder & Riefer, 1990; Meiser & Bröder, 2002). The formula $[D_A \times d_A] + [D_A \times (1\text{-}d_A) \times a] + [(1\text{-}D_A) \times b \times a]$ represents the answer category *AA*. A good fit of the whole model is assumed if the χ^2-distributed goodness-of-fit-index G^2 is not significantly different from zero. Basically, this kind of multinomial model will be used for Experiments 1, 2 and 3.

If more than one source dimensions is employed (e.g. memory for size *and* location of items, or the source *and* the background of the information) the multinomial source monitoring model for crossed source information (Meiser & Bröder, 2002) is the appropriate assessment tool. Additional parameters for the memory for the second source dimension are inserted there. The probability parameter *e* reflects the memory for the source for the second dimension provided that the source in the first dimension was not remembered. The parameter *g* stands for guessing the source of the first *and* second dimension for unrecognized target items. The multinomial source monitoring model for crossed source dimensions allows the assessment of item source, and context memory for consistent and inconsistent items under conditions of load and no load. It also provides an opportunity to compare the memory quality in different presentation phases. It will be described in further detail in the third experiment.

5.2 Experiment 1

5.2.1 Introduction

It is widely assumed that advantages in memory for inconsistent information are characterized by deeper processing and events of inconsistency resolution and individuation particularly under conditions of sufficient cognitive resources (Norman & Bobrow, 1975; Hastie & Kumar, 1979; Craik & Lockhart, 1972; Hastie, 1981; Srull & Wyer, 1989), and that these "depth of processing"-attempts will be impaired by concurrent executive tasks (Hilton & von Hippel, 1996; Macrae et al., 1999). On the other hand there are findings of substantially better memory for details of inconsistent information even under conditions of cognitive load

(Sherman et al., 1998; Sherman et al., 2004) and a better source memory even under conditions of scarce cognitive resources (Ehrenberg & Klauer, 2005).

Macrae and colleagues (1999) predicted and found an impaired inconsistency resolution by a concurrent strategic-executive task. Recollection memory for inconsistent information was diminished under conditions of cognitive load. That the process of individuation was diminished by the executive demand becomes apparent in lower source memory for inconsistent information.

Following the approach by Macrae and colleagues, source memory for consistent information should be better than source memory for inconsistent information under load. And with an increasing amount of information about the individual target person the individuation process should be consistently impaired by cognitive load and the consistency advantage for source information should remain unchanged.

Another important point is made by the depth of processing model (Hastie, & Kumar, 1979), which binds the necessity of deeper processing in inconsistency resolutions to the novelty value of the perceived information. The novelty value itself is influenced by serial position of the item, the number of similar previous behaviours and the degree of incongruence with the current trait impression. It can be hypothesized that with an increasing amount of individuating information the higher novelty value advantage for inconsistent information is reduced during the impression formation process. This may result in a decreasing memory also for sources and perceptual/contextual details of inconsistent information. But following Hastie and Kumar the memory for inconsistent information is influenced by cognitive load. The inconsistency resolution, seen as responsible for the inconsistency advantage, is depleted by cognitive load, so that there should be no memory advantage for inconsistent information under load. Hastie and Kumar did not include memory for sources or contextual details in consideration but:

With Hastie and Kumar, inconsistency resolution and individuation should – as resource consuming processes – are impaired by load that also affects source memory and contextual details.

The encoding flexibility model (Sherman et al., 1998, 2004) explains the inconsistency advantage in recognition memory not as a consequence of deeper processing within

inconsistency resolution but as a result of a more superficial, automatic attention reallocation process based on substantial vigilance mechanisms. Under conditions of scarce cognitive resources the EFM predicts an attention shift from processing of perceptual details of consistent information towards details of parallel presented inconsistent information. By contrast, Ehrenberg and Klauer (2005) found better memory not only for inconsistent information presented alone (one item at a time compared to parallel presentation with consistent items) but also for the personal source of inconsistent information, which may be semantically more meaningful than mere perceptual details and is susceptible to individuation processes, which are usually assumed to be depleted by cognitive load – which was certainly *not* the case in the study by Ehrenberg and Klauer.

In the theoretical context of the assumptions of a more adaptation seeking processing, and which contrasts with the effort-preventing-assumptions, it can be assumed that cognitive load has no effect on the encoding for as long as the information fits a specifically primed category. If the fit is reduced during the impression formation the categorical memory advantages should decrease.

Together with the EFM and the meaning-seeker-assumption and contrary to the usual inconsistency-resolution-depth-of-processing-assumptions it is hypothesized that source memory is better for inconsistent information in the initial part of the impression formation process. Additionally, within the framework of the procedural models it is assumed that with the growth of individuating information the initial stereotype label will – regardless of cognitive load – lose its referential value because of reduced fit with the social category of the target person. Finally, the differences between source memory for consistent and inconsistent information should decrease.

Combined with Experiment 1 is an initial test of the stimulus material which is based on an extended replication of the study by Ehrenberg and Klauer (2005). They found a better memory for the target person if the presented behaviour was inconsistent. This effect was revealed under conditions of cognitive load and a prolonged retention interval.

Experiment 1 used the basic conditions of the study by Ehrenberg and Klauer. Our participants were presented with the same amount of stereotype-consistent, inconsistent and neutral behaviour descriptions and asked to classify the items as *old* or *new* and then to assign the old items to one of both target persons.

In contrast to Ehrenberg and Klauer Experiment 1 manipulated cognitive load with a vigilance task that is expected to impair perceptual attention towards perceptual details of the target information. The employed multinomial model analysis of the data allows the separate analysis of memory and guessing tendencies.

In accordance with Ehrenberg & Klauer (2005) the results of this experiment were expected to document better memory of the target person for stereotype-inconsistent behaviour descriptions and, additionally, a decrease of the initial memory advantage.

5.2.2 Method

The 1st experiment has a 2 (concurrent task: load vs. no load) x 2 (source: physician vs. prostitute) x 3 (target valence: positive, negative, neutral) x 3 (presentation phase: first 16 items, second 16 items, third 16 items) mixed design with repeated measures on the last three factors.

Participants 64 students at the Friedrich-Schiller-Universität Jena/ Germany were given 7 € for their participation in the Experiment 1. The experiments were run in sessions with a maximum of five participants. Participants were randomly assigned to the load/no load condition so that 33 participants were in the no load condition and 31 participants were in the load condition.

Materials Two female target persons of approximately the same age were introduced as a prostitute and a physician, named Andrea or Claudia and living in Dresden. The prostitute was described as double-faced, arrogant, and uninterested in her social surrounding. The physician was described as open-minded, kind and interested in her social surroundings. Both target persons were represented by a portrait photo according to their described character showing a kind woman and arrogant looking woman.

Ninety-six items were taken from a pre-test by Ehrenberg, Cataldegirmen, & Klauer (2000) such that the selected items fitted the targets' gender and were in accordance to the stereotype valence (positive, negative, neutral). An inconsistent item resulted for instance in a combination of positive source and negative target-item combination, a consistent item in a negative source and negative target-item combination. Neutral items were neutral for both sources.

The participants were presented with 48 items in the presentation phase and 48 target items and 48 distractors in the test phase. Item order and item valence/target person combination were randomized so that a positive item served as a consistent item for the physician and the same time (for another participant) as an inconsistent item for the prostitute

and vice versa. Essentially, item valence target person combinations were randomized across participants.

Twenty-four items were presented about each target person: eight positive, eight negative and eight neutral behaviour descriptions. In the test phase the items were presented in a new order mixed with 48 distractor items, which were pulled from the same pool of items where the target items originated.

Cognitive load was manipulated with a vigilance task. The participants were presented with a randomly emitted short Windows-system tone in intervals of 0.5 to 2 seconds. They were instructed to press the space bar at the computer keyboard whenever they heard the tone.

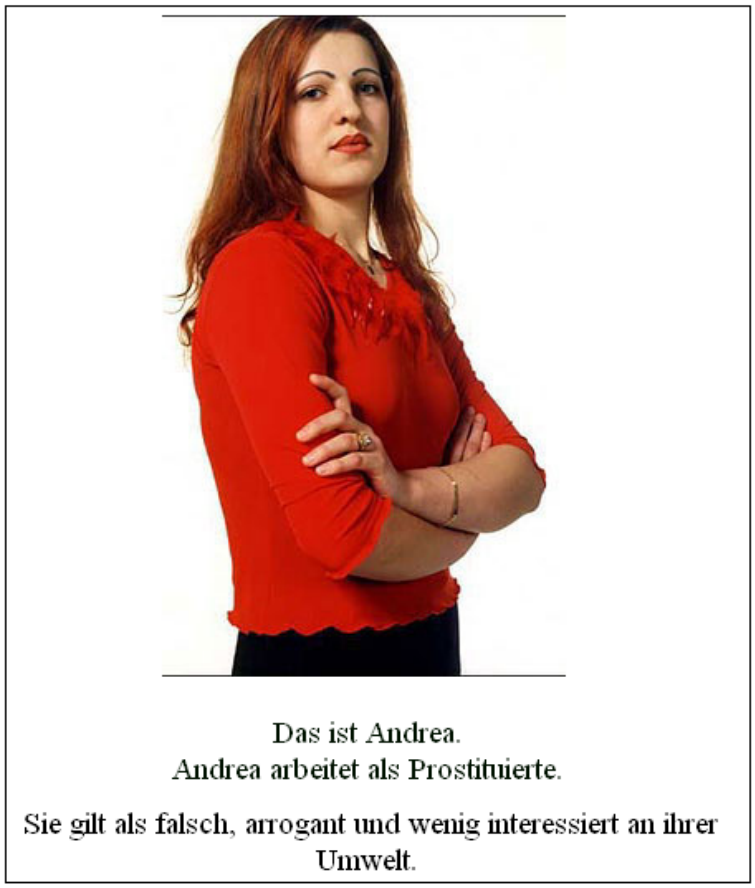

Figure 5. Presentation of the prostitute-target-person and the introduction

The retention interval (30 minutes) was filled with the task to listen carefully to a radio broadcast about the social security system in Germany in order to be able to summarize and to its content afterwards. After the retention interval the participants were instructed to give a short summary of their impressions. The form field was restricted to 18 lines.

Procedure At their individual arrival participants were sat into single cubicles. The sessions started simultaneously and were run fully computerized. The participants were led to believe that the experiment is a study concerning young adults in East Germany conducted by scientists and journalists, and they were asked to read short descriptions of people from different social classes to form impressions about them and to answer some questions afterwards. After the introduction of the two target persons (see Figure 5 and 6), the participants were asked to form an impression of the targets. Each participant saw 8 positive, 8 negative and 8 neutral behaviour descriptions about the physician and 8 positive, 8 negative and 8 neutral behaviour descriptions about the prostitute in random order for 6 seconds each.

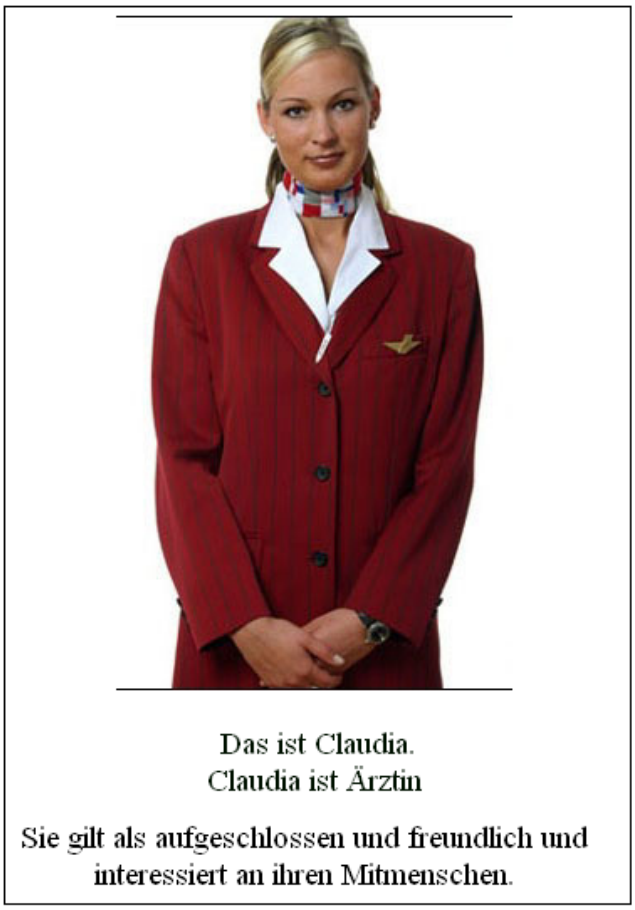

Figure 6. Presentation of the physician-target-person with introduction

In the next stage participants were asked to rate the target persons on several trait dimensions and tell their general sympathy for both professions. After the ratings the participants were instructed to estimate the amount of positive and negative items shown

about one of the target persons in the presentation phase. Finally, they were asked to answer some biographical questions and were thanked, paid, and later received a debriefing email.

Data analysis The item amount of the whole presentation phase was split into three segments of 16 items each. This division is oriented towards the amount of consistent and inconsistent items used by Hastie & Kumar (1979). Consistent items at an early stage of presentation were directly compared with inconsistent items at the same stage. At the point of the 16th item the participants had seen on average 5 consistent and 5 inconsistent items (and 5 neutral). In the study by Hastie and Kumar the inconsistency advantage is *at this stage* in all proportion-conditions irrefutably obvious. Macrae and colleagues (1999) also presented this amount of items about their particular target person.

At the stage of the second phase the participants saw about 10 items of each consistency value comparable to the relative amount of items used by Sherman and colleagues (1998, 2000). The third stage (16 items for each consistency value) is oriented on the study by Ehrenberg & Klauer (2005) and on the average amount of items used in studies concerning the memory for consistent and inconsistent information as can be seen from the meta-analysis by Stangor & McMillan (1992).

The previously described multinomial model was employed, with the following parameters for data analysis: *D* for item memory; *b* for item guessing; *d* for source memory; and *a* for source guessing. The parameters for the detection of new items were set equal with the corresponding item detection parameter. This resulted in a saturated model, and this was adapted according to the hypotheses. The source guessing parameters *a* for consistent and inconsistent items were set equal, which was unproblematic because they were estimated with the same value.

Hypothetically it was assumed that there is no difference between consistent and inconsistent item detection parameters and only a general load effect. It was also predicted that there is no difference between the consistent and inconsistent source detection parameters without cognitive load, whereas under cognitive load an inconsistency advantage was expected. Moreover, the inconsistency advantage for source memory was suspected to decrease over the presentation phase.

The following parameter restrictions of the multinomial model for all phases (x denotes cognitive load; y denotes valence; z denotes consistency) were tested by setting the parameters equal:

a) $D_{load \mid y \mid z \mid} = D_{no\ load \mid y \mid z \mid}$

b) $D_{x \mid y \mid consistent} = D_{x \mid y \mid inconsistent}$

c) $D_{x \mid negative \mid consistent} = D_{x \mid negative \mid inconsistent} = D_{x \mid positive \mid consistent} = D_{x \mid positive \mid inconsistent}$

d) $d_{load \mid y \mid consistent} = d_{load \mid y \mid inconsistent}$

e) $d_{no\ load \mid y \mid consistent} = d_{no\ load \mid y \mid inconsistent}$

f) $d_{load \mid negative \mid consistent} = d_{load \mid negative \mid inconsistent} = d_{load \mid positive \mid consistent} = d_{load \mid positive \mid inconsistent}$

Moreover we tested source memory in phase one against source memory in phase three: $d_{phase\ 1 \mid y \mid z} = d_{phase\ 3 \mid y \mid z}$

5.2.3 Results and discussion

Item Memory The hypothesis of equal parameters for item memory under cognitive load (a) had to be rejected for the full data ($\Delta\chi^2(4) = 26{,}22$, $p < .05$), phase one ($\Delta\chi^2(4) = 26{,}84$, $p < .05$) and two ($\Delta\chi^2(4) = 7{,}34$, $p < .05$) as can be observed in Table 2. In phase three the parameters increasingly approximated equality.

	General		Phase one		Phase two		Phase three	
	$\Delta\chi^2$	df	$\Delta\chi^2$	df	$\Delta\chi^2$	df	$\Delta\chi^2$	df
a	26,22*	4	26,84*	4	7,34*	4	3,82	4
b	10,99*	4	23,30*	4	1,59	4	1,68	4
c	11,21	6	23,96*	6	2,08	6	3,09	6
d	12,99*	2	9,28*	2	14,49*	2	5,83	2
e	7,29*	2	4,65	2	6,77*	2	1,92	2
f	13,55*	3	9,44*	3	18,39*	3	18,49*	3

Note. * $p < .05$*

Table 2. Values of $\Delta\chi^2$ for sub-models of the multinomial memory model for Experiment 1.

This indicates an effectiveness of the load manipulation in general and specifically for the first two phases. It also indicates a diminishing cognitive load effect – at least for this kind of load manipulation.

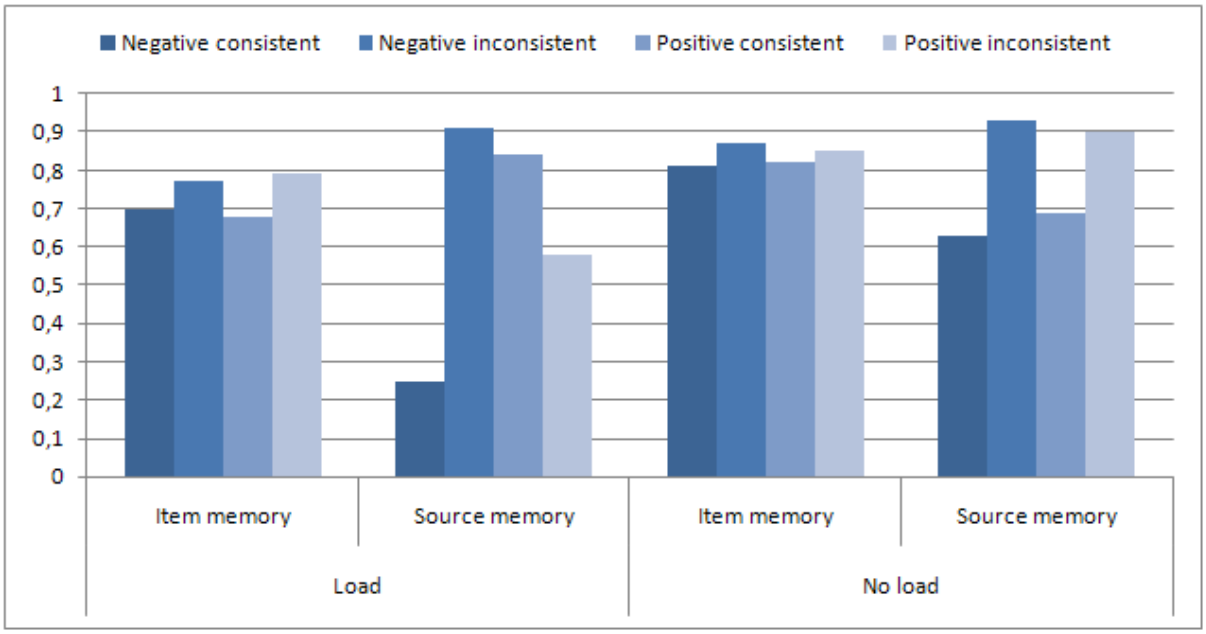

Figure 7. Item and source memory in Experiment 1 (full data) as a function of cognitive load, valence and consistency between target person and item information

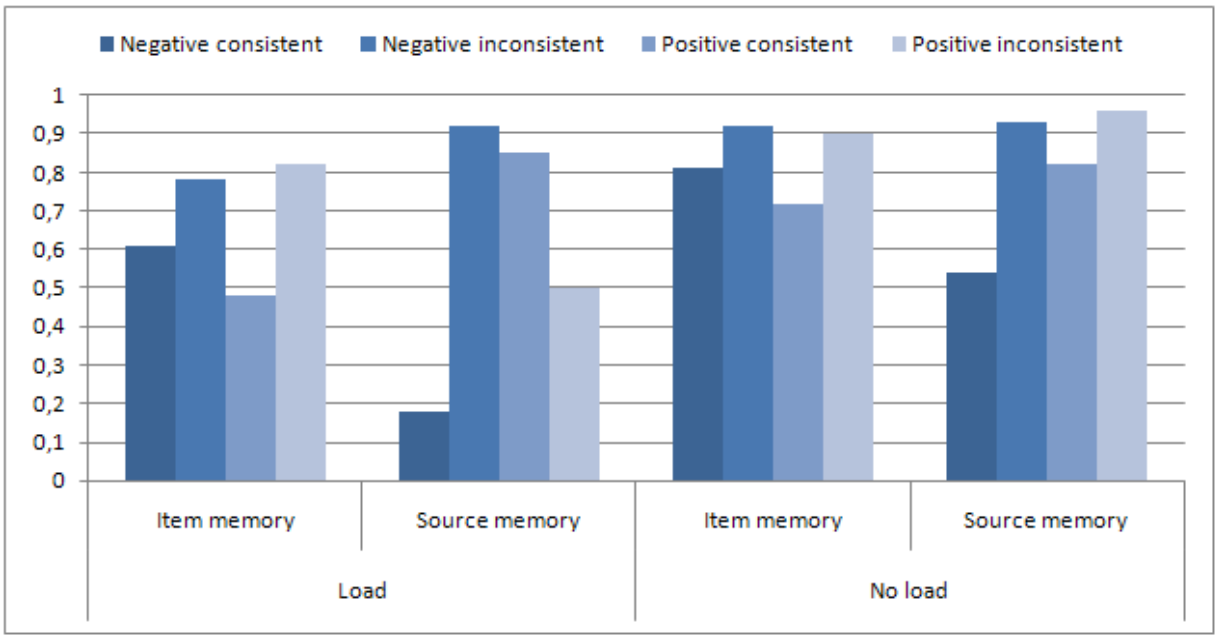

Figure 8. Item and source memory in Experiment 1 (phase 1) as a function of cognitive load, valence and consistency between target person and item information

The hypothesis of the equal memory for consistent and inconsistent information in general (b), independent of the load manipulation, also had to be rejected for the complete

data ($\Delta\chi^2(4) = 10{,}99$, $p<.05$, see Figure 7) and for phase one ($\Delta\chi^2(4) = 23{,}30$, $p<.05$, see Figure 8) but not for phase two (Figure 9) and three (Figure 10). Obviously, there is a general memory advantage for inconsistent item information – irrespective of any load manipulation.

This result stands in opposition to earlier findings and hypotheses of memory for inconsistent item information and inconsistency resolution but is in line with *meaning-seeker*-assumptions. By setting the valence parameters equal (c) the difference between the consistent and inconsistent item detection parameters disappeared for the whole data but not for phase one ($\Delta\chi^2(4) = 23{,}96$, $p<.05$). This can be traced back to a significant difference between positive consistent and positive inconsistent item detection parameters in phase one. In sum, the hypothesis of differences only for load and no load in parameters for item detection found by Ehrenberg and Klauer (2005) finds small support from our data.

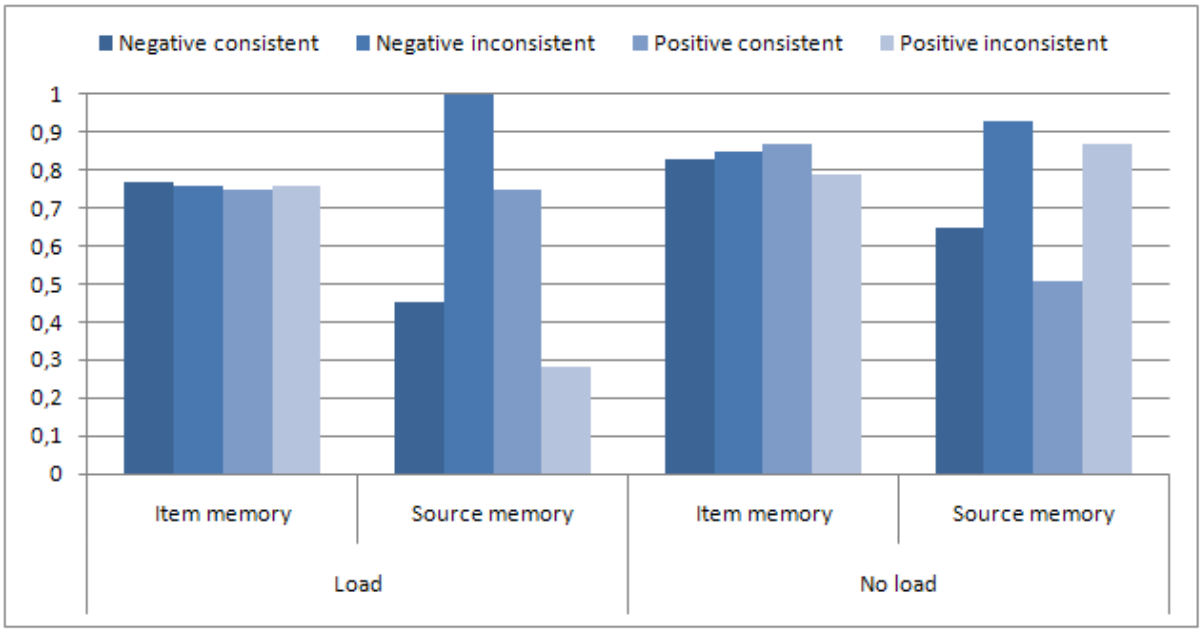

Figure 9. Item and source memory in Experiment 1(phase 2) as a function of cognitive load, valence and consistency between target person and item information

Source Memory The main interest here was a test for significant differences in memory for the sources of consistent and inconsistent information in the according parameter estimates. Setting the parameters for consistent and inconsistent source detection equal (d) resulted in significant differences for the full data (Figure 7) and phase one (Figure 8) and two (Figure 9) but not phase three ($\Delta\chi^2(4) = 5{,}83$, $p=.05$, see Figure 10). This could also be

attributed to a diminishing cognitive load manipulation. Although the inconsistency advantage for negative source information (negative information about the physician compared to negative information about the prostitute) is very strong and persistent over the presentation phase, whereas the memory for positive inconsistent information (positive information about the prostitute) increases strongly from phase 2 to phase 3, a test revealed that this reached significance only for the negative information condition. There was also a strong negativity effect detected, which was most obvious in phase two of the impression formation process. Here ceiling effect occurred indicating – together with very well memory in general – the limits of the cognitive load manipulation.

All in all, the memory for information concerning the physician appears to be better remembered under load. Setting the valence and consistency parameters equal (f) resulted in strong and significant effects, which underlines the importance of valence in this paradigm. But the inconsistency advantage is not restricted to the load condition. Also a significant inconsistency advantage was found for the target person in the full data and the second phase but not the first and the third phase by setting the source detection parameters for "no load" equal (e).

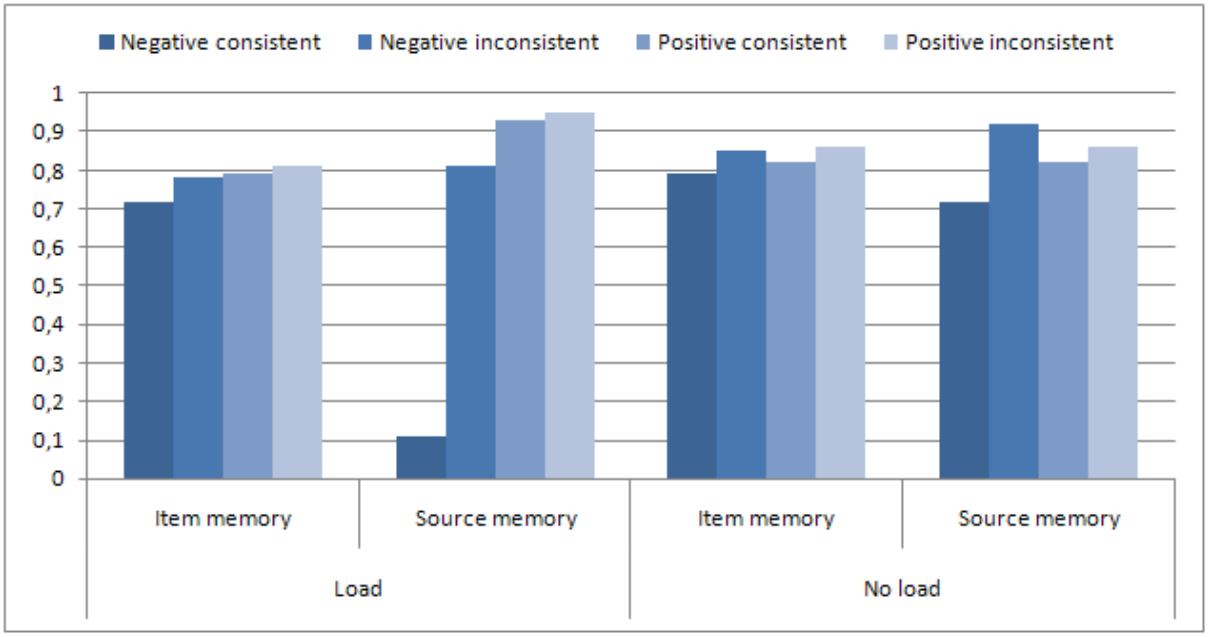

Figure 10. Item and source memory in Experiment 1 (phase 3), as a function of cognitive load, valence and consistency between target person and item information

Phase differences The final hypothesis contained the assumption that the source memory advantage decreases over the full behaviour description period. There was concentration on the load manipulation, since the hypotheses are primarily focused on the load conditions, and compared only phase one and three with each other because memory for negative inconsistent information in phase two reached the edge of the parameter space.

The assumption that setting of d-parameters equal results in significant changes could not be confirmed even though by looking at the parameters an improvement of inconsistent source memory for positive information seems obvious (see Fig. 11). However, post hoc a significant improvement of the item memory for positive consistent information appeared under load between phase 1 and phase 3 ($\Delta\chi^2(1) = 7{,}96$, $p < .05$).

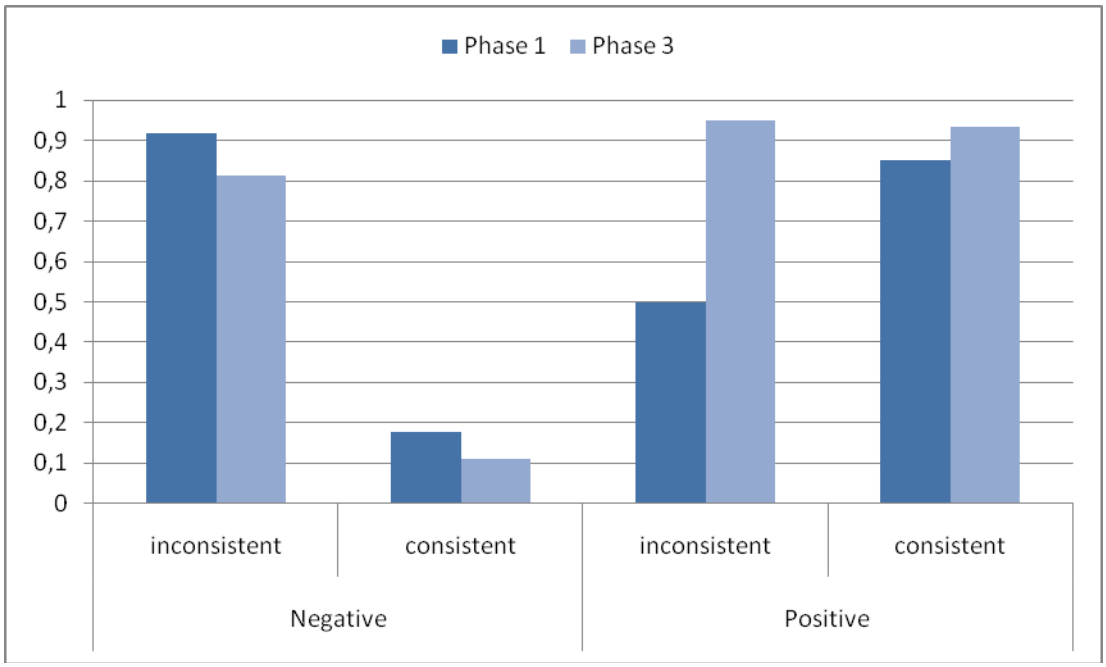

Figure 11.Source memory in Experiment 1, load condition, as a function of presentation phase, valence and consistency between target person and item information.

5.2.4 Summary

The first experiment mainly yielded the expected results, i.e. an inconsistency advantage for source information. However, this effect is not restricted to the load condition and strongly valence dependent. Furthermore, the expected load effect for item detection has been found but the decreasing of the inconsistency advantage could only be validated for item memory but unfortunately not significantly – as previously hypothesized – for source memory. Despite the fact that the load manipulation seemed to be effective, at least for item memory, there was no significant effect of load on the inconsistency advantage in source

memory. In the theoretical frameworks of the inconsistency-resolution-depth-of-processing-models a load-independent inconsistency advantage for source and item memory is not very confirmative. However, also main assumptions of the EFM were not confirmed, namely that the shift of information processing capacity from consistent towards inconsistent information is a load dependent inconsistency memory advantage. The shift-of-attention-hypothesis is obviously not necessary. Neither is the assumption of better memory only for irrelevant context information, because memory was attested to be very good for item information as well as for semantically valuable source information.

Unfortunately, the hypotheses concerning the diminishing inconsistency advantage for source information were not statistically confirmed – but unexpectedly we found a significant decrease of an consistency disadvantage in item memory in comparison of the 1st and the 3rd presentation phase, which is ascribable to an increase for positive consistent information over the presentation phases.

One explanation for these mixed results could be an inappropriate load manipulation leading to an effective attention disruption. Even though there was a significant load effect on item memory in general the criteria for the discrimination of consistent and inconsistent information may not have been sufficiently implemented in the experimental design.

If the load manipulation was insufficient the decreasing inconsistency advantage could also be explained by the inconsistency-resolution-assumptions and they fit the meaning-seeker-hypotheses with the assumption of less categorisation effects by the accommodation of the memory for consistent and inconsistent information what is here obviously an increase of memory for consistent information.

5.3 Experiment 2

5.3.1 Introduction

In Experiment 1 an inconsistency advantage for source information was observed, which can be interpreted as a result of an individuation process. On the other hand, the findings by Ehrenberg and Klauer (2005), interpreted according to the EFM (Sherman et al., 1998; Sherman et al., 2004), suggest that the advantages in memory for source information are not a consequence of a strategic, semantically laborious individuation process but of an automatic attention reallocation process towards surface characteristics and perceptual/contextual details of inconsistent information.

To test these contrary assumptions behaviour descriptions were presented on a left or right screen position in Experiment 2 to investigate the encoding sensitivity for semantically unrelated contextual details of inconsistent and consistent information. The sensitivity for screen position in source memory measures was used in various other contexts (e.g. Meiser, Sattler, & Weißer, 2008; Sherman et al., 2004). The load manipulation was implemented with a combination of a vigilance task and the acknowledged "eight-digit memory task", which has been successfully employed in several other studies concerning memory for consistent and inconsistent information (Sherman et al., 1998; Gilbert & Hixon, 1991). The combined presentation of both additional tasks followed the assumption that with the organisation of two challenging tasks in two cognitive domains important for encoding – attention and memory – the executive functioning will be exceedingly impaired. The impairment of the executive functioning by demanding tasks is deemed to affect particularly the supposed inconsistency resolution and individuation attempts (Macrae et al., 1999).

Following the inconsistency resolution hypotheses (Macrae et al., 1999; Hastie & Kumar, 1979) there is a better memory for consistent item information under circumstances of cognitive load. According to main predictions of the EFM (Sherman et al., 1998), better memory for the screen position of the behaviour descriptions if they were inconsistent was also expected. Additionally, it was assumed that the advantages in memory for contextual details of inconsistent information will diminish over the presentation phase because of the desire for adequate perception and interpretation of the surroundings in the face of the weak fit of the presented information and the primed social category. If the inconsistency advantage is the consequence of an automatic attention reallocation process, as an effect inconsistent information generally induces, it may not be diminished during the impression formation process. With Hastie and Kumar (1979) an advantage induced by inconsistency resolution

will diminish during the impression formation because of the decreasing informational value of inconsistent information in association with the general amount of inconsistent information, its position during the presentation, and its general inconsistency degree. But this process is seen as impaired by cognitive load and according to Hastie and Kumar may not be very probable.

If the inconsistency advantage is more than an automatic attention reallocation or an automatic inconsistency resolution, the attention and memory for contextual details may be very well in the initial part of the impression formation, because a necessary strategic process in the attempt to interpret the world and predict its inconsistencies correctly should be largely unaffected by concurrent tasks. The continuous loss of predictive value of task-irrelevant but systematically varying context information should result in a reduced difference in memory for contextual details of consistent and inconsistent information.

In the sense of the EFM and the adaptation assumption an inconsistency advantage in memory for contextual details of inconsistent information is suggested which, in contrast to assumed implications of the EFM and the inconsistency resolution assumptions, is supposed to be a diminishing inconsistency advantage, independent of the present cognitive load.

5.3.2 Method

The 2nd Experiment had a 2 (concurrent task: load vs. no load) x 2 (source: physician vs. prostitute) x 2 (screen position: left vs. right) x3 (target valence: positive, negative, neutral) x 3 (presentation phase: first 16 items, second 16 items, third 16 items) mixed design with repeated measures on the last two factors.

Participants 113 students at the Friedrich-Schiller-University Jena/ Germany were given 7 € for their participation in Experiment 2. The experiments were run in sessions of a maximum of five participants. Participants were randomly assigned to the cognitive load and the target employment condition, so that 27 participants were in the no load/prostitute condition; 27 in the no load/physician condition; 31 in the load/prostitute condition and 21 participants were in the load/physician condition. The data of seven participants was excluded from analysis because of software errors.

Material One of two pretested female target persons was introduced to each participant as a prostitute or as a physician, named Andrea or Claudia and living in Dresden. The prostitute was described as double-faced, arrogant, and uninterested in her social surroundings. The physician was described as open-minded, kind, and interested in the people

around her. Both target persons were represented according to their described character by a portrait photo showing a kind physician and arrogant-looking prostitute.

Figure 12. Example of the presentation of the physician-target-person with the behaviour description on the right screen position

Ninety-six items were taken from a pre-test by Ehrenberg, Cataldegirmen, & Klauer (2000) such that the selected items fitted the targets' gender and were in accordance to the stereotype valence (positive, negative, neutral). An inconsistent item resulted for instance in a positive source/negative target-item combination, a consistent item in a negative source/ negative target-item combination. Neutral items were neutral for both sources.

The participants were presented with 48 items in the presentation phase and 48 target items and 48 distractors in the test phase. Item order and item valence/target person combination were randomized so that a positive item served as a consistent item for the physician and the same item served for different participants as an inconsistent item for the prostitute and vice versa, randomized across participants.

All forty-eight items were presented about one target person, the prostitute or the physician, sixteen positive, sixteen negative and sixteen neutral behaviour descriptions. The items were presented one at a time on the left or on the right screen position, below the picture of the target person. The presentation on a certain screen position was completely randomized and there were no correlations between screen position and valence of the target item (see Figure 12 & 13). The photos of the target persons and the behaviour descriptions

were presented on the top centre of the screen in a 1024 x768 pixel screen resolution. Both, behaviour description and target photo were presented at the same time, with a duration of 6 seconds.

Figure 13. Example of the presentation of the prostitute-target-person with the behaviour description on the left screen position

Cognitive load was manipulated with a vigilance task. The participants were exposed to a randomly emitted, short Windows-system tone in intervals of 0.5 to 2 seconds. The participants were instructed to press the ”Y”-key on the computer keyboard whenever they heard the tone. To enhance the load pressure, participants were requested to keep an eight digit number in memory until when they were asked to recall it.

The retention interval was filled with the task to listen carefully to a radio broadcast about the social security system in Germany to achieve the ability to tell subsequently what had been heard. After the retention interval the participants were instructed to give a short summary of their impressions.

In the memory testing phase the behaviour descriptions and the distractors were presented in the middle of the screen below the photo of the target person. Below the behaviour descriptions *old* and *new*-buttons were presented (see Figure 14). Now the participants had to classify the presented information as *old* or *new* with the help of

corresponding buttons in the bottom line of the screen. After the behaviour description was classified as *old* it then appeared again on both (left and right side) of the screen.

Figure 14. Example of the presentation of the physician-target-person with the behaviour description for the old/new decision task

Procedure Upon their individual arrival, participants were sat into single cubicles. The sessions started simultaneously and were run fully computerized. The participants were led to believe that the experiment is a study concerning young adults in East Germany conducted by scientists and journalists, and they were asked to read short descriptions of people from different social classes to form impressions about them, and to answer some questions afterwards. After the introduction of the two target persons, the participants were asked to form an impression of the targets. Each participant saw 16 positive, 16 negative, and 16 neutral behaviour descriptions about the physician or the same segmentation of behaviour descriptions about the prostitute in random order for 6 seconds each. Participants in the load condition had to press the space bar whenever a randomly generated tone occurred. After the retention interval of 30 minutes the participants were surprisingly asked to accomplish a recognition task. The 48 behaviour descriptions shown in the presentation phase and 48 distractors appeared one at a time on the screen. By clicking the *old* or *new* buttons the

participants had to decide whether the behaviour description has been displayed before or not. If, on the other hand, they declared the item as *new* the next behaviour description appeared.

Figure 15. Example of the presentation of the physician-target-person with the behaviour description for the old/new decision task

After the classification as *old* the particular item was presented on both sides of the screen and the participants were asked to specify the original screen position with a mouse click on the behaviour description on the left or the right screen side (see Figure 15).

Subsequent to the memory task the participants were instructed to estimate the amount of positive and negative items shown about the target persons in the presentation phase. Finally, they were asked to answer some biographical questions, were thanked, paid, and received a debriefing email.

Data analysis A multinomial model for source monitoring for data analysis as described in the 1st Experiment was employed with the following parameters: *D* for item memory; *b* for item guessing; *d* for source memory, and *a* for source guessing. The parameters for the detection of new items were set equal with the according item detection parameter. The remaining multinomial model of source monitoring without a separation for valence contained the following source memory parameters: $d_{x \mid consistent}$ and $d_{x \mid inconsistent}$; where $d_{x \mid consistent}$ denotes source memory for the negative information about the prostitute and positive information about the physician, $d_{x \mid inconsistent}$ reflects source memory for negative information about the physician and positive information about the prostitute. Here, the variable x represents the two load conditions: load vs. no load. Comparable specifications

were made for item detection parameters: $D_{x \mid y}$ (where x denotes cognitive load; y denotes consistency), the item guessing parameters: $b_{x \mid y}$ and the source guessing parameters: $a_{x \mid y}$. This resulted in a satisfactory well fitted model for the complete data ($\chi^2(8) = 7.18$, $p < .52$) and the phase separation (Phase 1: $\chi^2(8) = 4.21$, $p < .84$; Phase 2: $\chi^2(8) = 4.30$, $p < .84$; Phase 3: $\chi^2(8) = 8.33$, $p < .4$).

According to the introduced hypotheses no difference between consistent and inconsistent item detection parameters and only a general load effect were expected. It was also assumed that there is no difference between the consistent and inconsistent source detection parameters without cognitive load. But under cognitive load an inconsistency advantage should appear. Additionally, it was supposed that the inconsistency advantage for source memory will decrease over the presentation phases. So the following model restrictions for all phases were tested:

a) $D_{load \mid y} = D_{no\ load \mid y}$

b) $D_{x \mid consistent} = D_{x \mid inconsistent}$

c) $d_{load \mid consistent} = d_{load \mid inconsistent}$

d) $d_{no\ load \mid consistent} = d_{no\ load \mid inconsistent}$

Additionally source memory in phase one against source memory in phase three in the load condition was tested: $d_{y \mid z} = d_{y \mid z}$

5.3.3 Results and discussion

Item Memory The hypothesis of equal cognitive load parameters for item memory (a) finds no support in the full data ($\Delta\chi^2(2) = 24.47$, $p < .05$) and phase one ($\Delta\chi^2(4) = 48{,}54$, $p < .05$), which can be observed in Table 3. This result is consistent with the findings by Ehrenberg and Klauer (2005) and the assumption that the load manipulation is a sufficient task demand. In phase two and three the parameters approximated equality and no differences between item memory for load and no load could be found anymore. The hypothesis of equality for consistent and inconsistent item information (b) is supported by the complete data ($\Delta\chi^2(2) = 1.90$, $p > .05$) and for phase one, two, and three (see Table 3 for all ratio statistics). Altogether, the assumption of general load effects on item memory which have no effects on memory for consistent and inconsistent item information is supported by this experiment (see Figure 16 and 17).

	General		Phase one		Phase two		Phase three	
	$\Delta\chi^2$	df	$\Delta\chi^2$	df	$\Delta\chi^2$	df	$\Delta\chi^2$	df
a)	24,47*	2	48,54*	2	1,32	2	2,50	2
b)	1,90	2	0,22	2	0,86	2	1,48	2
c)	0,75	1	4,37*	1	0,05	1	0,07	1
d)	0,28	1	1,12	1	0,14	1	0,33	1

Note. * $p < .05$

Table 3. Values of $\Delta\chi^2$ for sub-models of the Multinomial Memory Model for Experiment 2.

Source memory The equalisation of the consistent and inconsistent parameters for source memory under full cognitive capacity (d) does not worsen the model fit significantly, neither in the full data model nor in the individual phases. In contrast, the equalisation of the source memory parameters for the load condition (c) results in a significant inconsistency advantage only for phase one ($\Delta\chi^2(1) = 4, 37$, $p<.05$; see also Figure 16 and 17) but not for the remaining phases and the whole data – despite the significant load effect on item memory. These findings are in part compatible with the assumption of the EFM (Sherman et al., 1998, 2004) that perceptual/contextual details of inconsistent information receive particular attention under conditions of cognitive load.

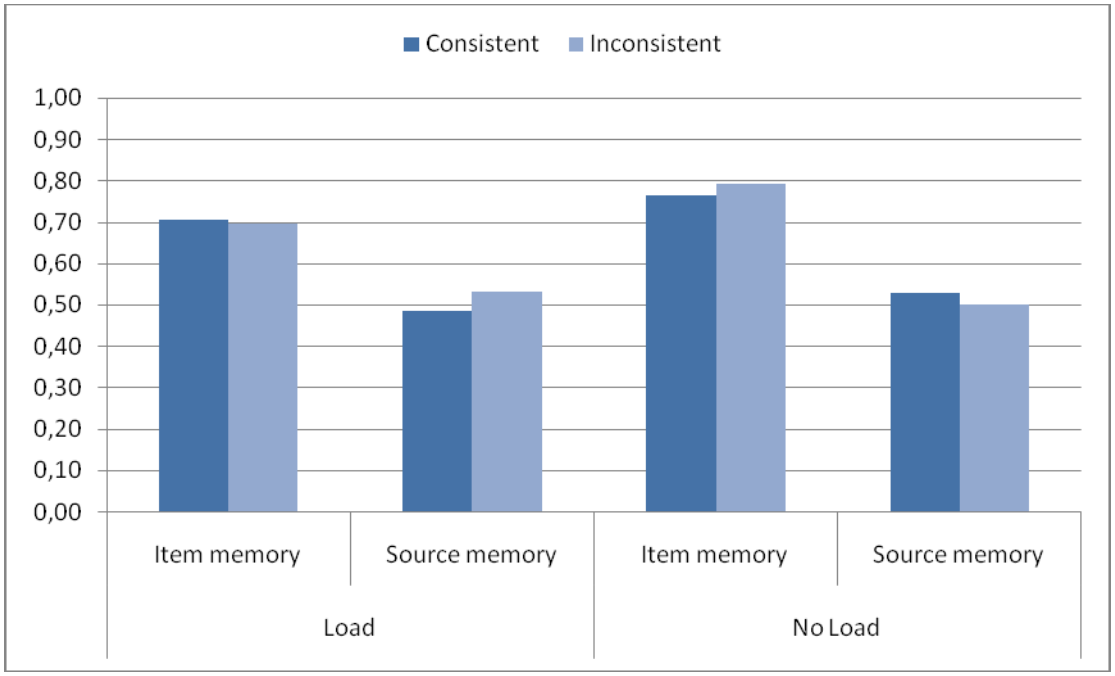

Figure 16. Item and source memory in Experiment 2 (full data) as a function of cognitive load and consistency between target person and item information.

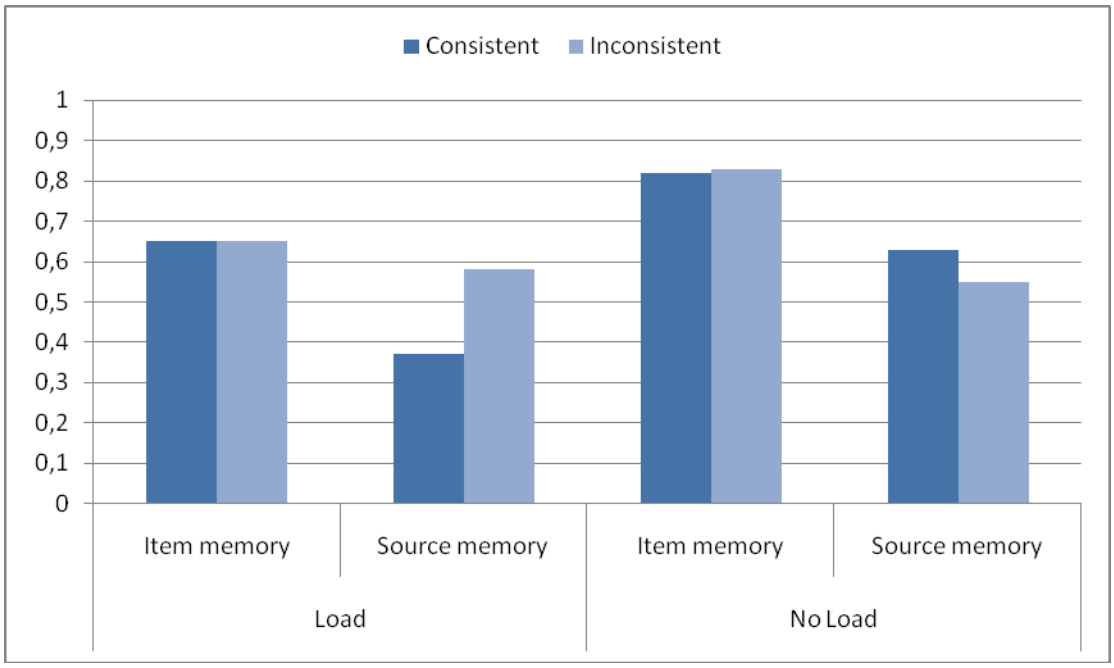

Figure 17. Item and source memory in Experiment 2 (phase 1) as a function of cognitive load and consistency between target person and item information.

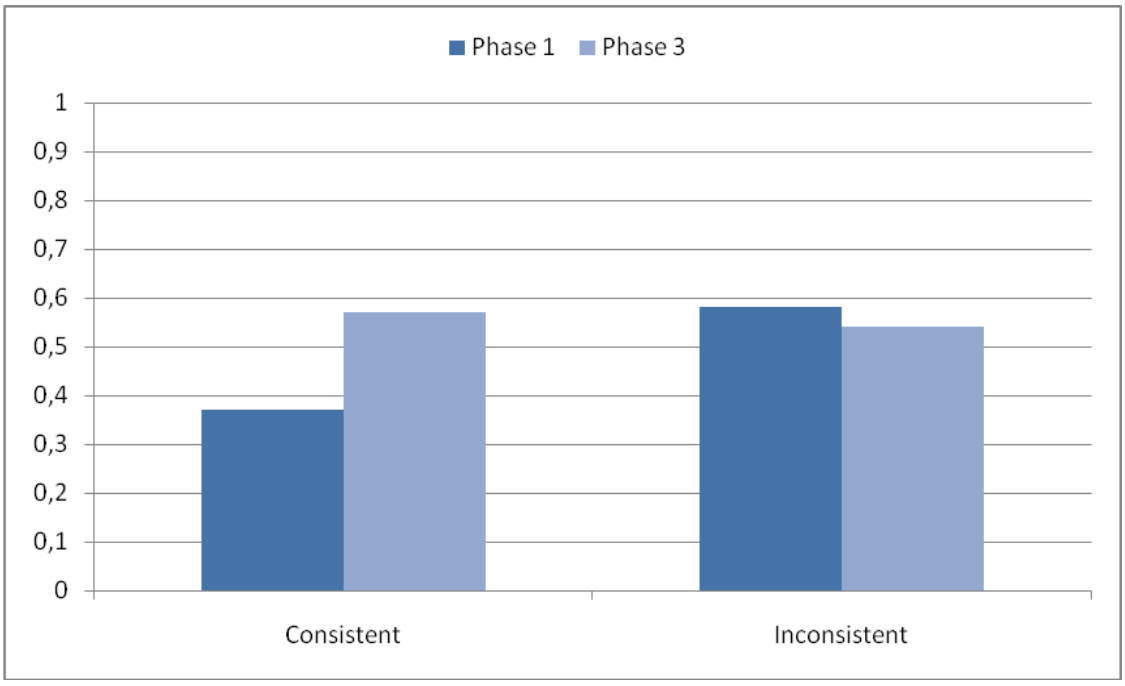

Figure 18. Consistent and inconsistent source memory under conditions of cognitive load. Comparison of phase one and three of the 2nd experiment

The prediction of decreasing consistency disadvantage during the presentation phases was tested by equalisation of the particular consistent parameters and the inconsistent parameters between phase one and two ($\Delta\chi^2(1) = 1, 65$, p=.2), two and three ($\Delta\chi^2(1) = 1, 65$, p=.48), and one and three ($\Delta\chi^2(1) = 4, 01$, $p<.05$). The results show a significant difference between phases one and three, which can be attributed to the significant growth of the memory for consistent source information between phase one and three ($\Delta\chi^2(1) = 4, 02$, $p<.05$; see also Figure 18).

5.3.4 Summary

The encoding flexibility model and the hypothesis of adapted anticipation are in part supported by the results of Experiment 2. The detected inconsistency advantage, that was only attestable in the first presentation phase but not in the remaining two phases and the general condition, indicates a diminishing inconsistency effect. This effect is not a mere consequence of increasing cognitive capacities. This is reflected in the results for the whole data, where significant cognitive load effects on item memory do not rub off on source memory. Nevertheless, diminishing cognitive load effects remain a possible explanatory factor for the diminishing of the inconsistency advantage in general.

The assumption regarding cognitive-load-dependent inconsistency resolution find no support in the data because there is no difference in item memory for consistent and inconsistent information and on the other hand there is an inconsistency advantage for contextual details of inconsistent information even under conditions of cognitive load.

The documented results of a decreasing source memory advantage are also in contrast with the findings and assumption by Sherman et al. (1998) and Mulligan (1998; Mulligan & Hartman, 1996), claiming that the encoding of perceptual information is generally unaffected by cognitive load processes, but stand in line with the assumption of the EFM that the different memory for perceptual details is a consequence of less attention for contextual details if consistent information is presented. One constant in this experiment was the impairment of the contextual encoding for consistent information, a fact that may be explained by a more conceptual processing (Sherman et al., 1998; Wigboldus, et al., 2003, Wigboldus, et al., 2004). That this is primarily an encoding and only secondarily a memory effect is reflected in the varying results for presentation phases. The assumption by Sherman an colleagues (1998) that saved attention resources are shifted away from the encoding of

consistent information and will be directed towards the encoding of perceptual details seems not to be required in this context because of the presentation independent of consistent and inconsistent items. But the needlessness of this assumption of the EFM remains to be tested experimentally.

In sum, the findings could imply that inconsistency advantages in encoding are indeed a consequence of inconsistency resolution and individuation/expectancy adaptation processes, which are hardly impaired by cognitive load. They can also be the result of the decreasing predictive value of the systematically varying and task irrelevant contextual information. That there is no change in *item* memory but in *source* memory over the presentation phases speaks for the latter hypothesis: no inconsistency resolution and no individuation take place but attention is directed towards any diagnostically useful detail in case of decreasing fit of expectation and perceived information.

The decreasing fit of expectation and actual behaviour can be misinterpreted as an argument in favour of the inconsistency resolution/individuation assumptions. Although, this does not hold because there is no *consistency* advantage in item memory under cognitive load – which is usually predicted by inconsistency resolution/ assumptions – and no change over the impression formation process in item memory without load. The latter is usually expected in individuation hypotheses. The initially higher attention towards seemingly diagnostic contextual information of stereotype-inconsistent behaviour and the initially weak but increasingly better memory for the contextual details of stereotype-consistent information speak for an inconsistency advantage that is actually a consistency disadvantage in context memory. This endorses the speculation that the participants – in search for meaning and order – increasingly consider also the contextual information of consistent behaviour as valuable for categorization attempts – regardless of cognitive load.

5.4 Experiment 3

5.4.1 Introduction

Experiment 1 and 2 revealed inconsistency advantages for item and source memory as well as irrelevant context information particularly under cognitive load as predicted in part by the EFM. Sherman et al. (1998; 2004) explain the inconsistency advantages in context memory with a stronger, automatic perceptual/contextual focus towards inconsistent information and the storage of perceptual details for later inspection. But the previous experiments revealed a significantly *diminished consistency disadvantage* (in item and source memory) in the last segment of the impression formation process, which can be interpreted in three different ways as a cognitive load independent

1. -consequence of individuation (individual organization of perceived impressions directly linked to the target person)
2. -consequence of inconsistency resolution (explaining and melting inconsistent information with prior stereotypical anticipation)
3. -adaptation strategy in search for diagnostic information triggered by the bad fit of expectation and actual behaviour.

The meaning of the terms individuation and inconsistency resolution is very complex but crucial for the present experiments. There are two levels of inconsistency resolution and individuation in the process of impression formation. Traditionally, the experimental investigation of "individuation" and "inconsistency resolution" refer to the processing of just one piece of information. But inconsistency resolution and individuation can also be understood otherwise – as accumulation and integration of information over time. Furthermore, inconsistency resolution and individuation can lead to a decreasing value of the primed social category as a basis for behaviour interpretation. Generally, better memory for the target person in combination with inconsistent item information, such as found in Experiment 1 speaks for an individuation effect as supposed by Macrae et al. (1999): This means a stronger integration of single pieces of information into a particular picture of a person rather than the attachment to categorical instances. The diminishing consistency disadvantage in item, source, and context memory also indicates an increasing inconsistency resolution and therefore the decreasing explanatory value of the primed social category. These assumptions encourage the prediction of increasing memory for the target person during a

longer impression formation process – if initially presented together with inconsistent information.

Following considerations concerning the impact of cognitive load on perception and memory for persons (Brewer, 1996; Macrae et al., 1999), a weak and continuously diminishing memory for inconsistent behaviour of a target person over the presentation phase is presumed if inconsistency resolution or individuation under load is expected to be impaired.

The EFM assumes only an automatic attention reallocation process towards the context of inconsistent information under conditions of scarce cognitive resources. Sherman and colleagues (Sherman et al., 1998; Sherman et al., 2004) found better memory for irrelevant details of inconsistent behaviour descriptions under cognitive load. Ehrenberg and Klauer (2005) documented a better memory for the target person if descriptions of inconsistent behaviour were presented under load and interpreted their results as evidence for the validity of the EFM.

According to the assumption of the EFM and parts of the results of the previous experiments, the hypothesis would be that – if the inconsistency advantage under load is a consequence of a nonstrategic attention reallocation process - memory for the target person and irrelevant context information will be of the same quality under conditions of scarce cognitive resources and for inconsistent item information as found in the 1st and the 2nd Experiment. In the sense of encoding flexibility as an automatic attention reallocation process there should be no change of the memory quality for irrelevant details of inconsistent information over the impression formation process.

Taking the meaning-seeker-hypothesis and the previous results of this dissertation into account it appears to be plausible that the advantages in source and context memory are the consequence of a strategic-meaning-seeking process initiated by the confrontation with disrupted expectancies and weak fit of social categories and behaviour. The diminishing fit of target person and primed social category and the differences between consistent and inconsistent information during the impression formation process should initially lead to an inconsistency advantage for seemingly diagnostic information, such as the screen position, that diminishes (irrespective of the cognitive load) during the impression formation process.

The third experiment was designed to present both target persons, according to the paradigm by Ehrenberg and Klauer (2005) – according to Experiment 1 – together with the behaviour descriptions on both screen positions as in Experiment 2. After the presentation phase and the retention interval the memory for each target person *and* the screen position was inquired.

5.4.2 Method

The 3rd Experiment has a 2 (concurrent task: load vs. no load) x 2 (source: physician vs. prostitute) x 2 (screen position: left vs. right) x3 (target valence: positive, negative, neutral) x 3 (presentation phase: first 20 items, second 20 items, third 20 items) mixed design with repeated measures on the last three factors.

Participants 167 students at the Friedrich-Schiller-University Jena/ Germany were given 7 € for their participation in Experiment 3. The experiments were run in sessions of a maximum of five participants. Twenty-five participants had to be removed from the analysis because of software errors. The remaining participants were randomly assigned to the cognitive load condition so that 74 participants were in the no load condition and 68 participants in the load condition.

Materials Both female target persons and the same 48 items introduced in Experiment 1 plus 12 additional positive, negative, and neutral items were now presented to each participant. Item order, screen position, and item valence/target person combination were randomized, so that a positive item served as a consistent item for the physician and the same item served – for a different participant – as an inconsistent item or distractor for the prostitute and vice versa.

In all, 60 items were presented about both target persons, the prostitute and the physician, 10 positive, 10 negative and 10 neutral behaviour descriptions about the prostitute and the same number of positive, negative and neutral behaviour descriptions about the physician.

The items were presented one at a time on the left or right screen position below the picture of each target person and. The presentation on the left or the right screen position was randomized and there were no correlations between the screen position and the valence of the target item. The items were presented so that 5 positive items about the prostitute appeared on the right side of the screen and 5 items appeared on the left side. This applies for all target person/valence/screen position combinations. The locations of and distances between the

photos and the behaviour description were identical to the second experiment. In the memory task the behaviour descriptions were first presented in the centre of the screen like in the second experiment. After the *old* /*new*-decision the behaviour descriptions were presented on both screen positions below the pictures of both target persons. The distance between the target persons amounted to 2cm. Four centimetres below each behaviour description on the left and on the right were two buttons with 4cm width and 1,5cm height and 1cm distance between each other and 3cm to the left or right screen edge labelled "Prostitute" and "Physician" so that altogether four clickable buttons were visible.

Again, cognitive load was manipulated with a combination of a vigilance task and the eight-digit-memory task as described in Experiment 2. The retention interval task was also the same as in Experiment 1.

The items were presented in such a way that the presentation phase could be separated into 5 sections of 12 valence (3) x target person (2) x screen position (2) combinations. In each section one of each possible combination of valence, target person, and screen position was presented. In the partition of the three presentation phases the equability constraints of the item proportions made it necessary to separate the presentation phases into 24 first items and 24 last items – instead of a 20+20+20=60 design. In the experiments before distances of 16 to 16 to 16 (sum 48) items were used. The evaluation of the 12 first items was refused because of many zero valued cells in the frequency tables.

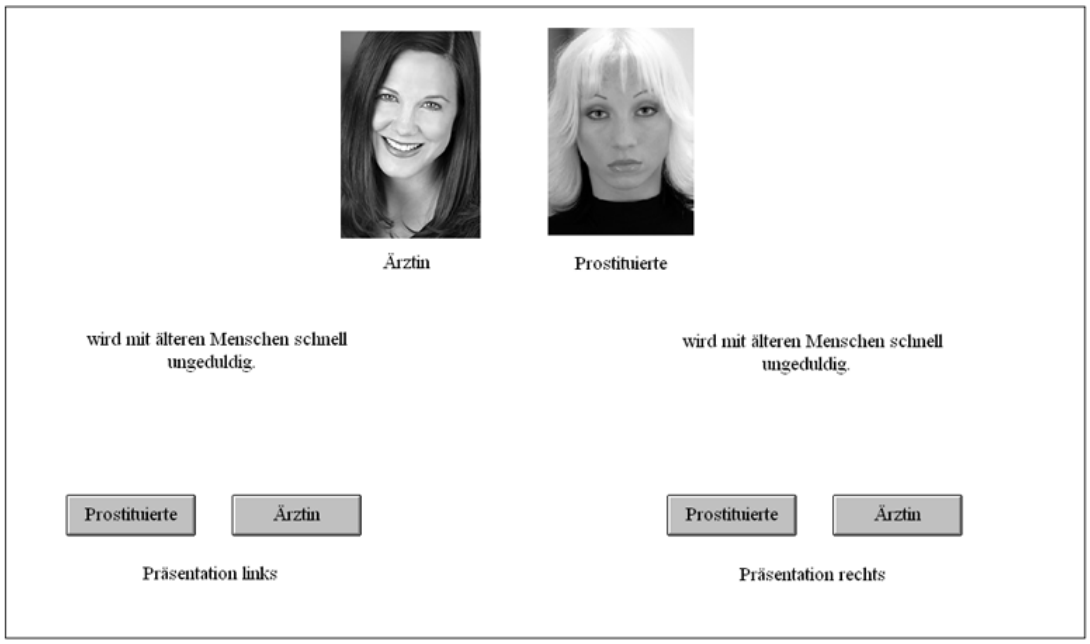

Figure 19. Example of the presentation of the screen position and target person recognition task

Procedure At their individual arrival participants were seated into single cubicles. The sessions started simultaneously and were run fully computerized. The participants were asked to form impressions of two women, a physician and a prostitute. After the presentation of the 60 behaviour descriptions and the retention interval, participants were asked to classify the items from a randomized pool of 60 previously presented and 60 distractor items as *old* or *new*. After the classification as *old* the particular behaviour description was presented on both sides of the screen. Additionally, the pictures of both target persons were presented above the behaviour descriptions. The participants were now asked to specify the original screen position *and* the target person with *one* mouse click on *one* button indicating the employment of the target person. There were four buttons indicating the employment, two on each screen side below the presented behaviour description (see Figure 19).

After the memory task participants were instructed to estimate the amount of positive items about the prostitute and the negative items shown about the physician in the presentation phase. Afterwards they were asked to rate the target persons on several trait dimensions. Finally, they had to fill in biographical data, were thanked, paid, and received a debriefing mail.

Data analysis A multinomial model for multidimensional source information based on the multinomial model for *crossed* source information (Meiser & Bröder, 2002) was employed in the analysis of the current data. This multinomial model is an extension of the standard unidimensional multinomial models and as well as hierarchically nested or partial models for more than one source dimension (Riefer, Hu, & Batchelder, 1994). It is especially applicable to simultaneously presented source dimensions. In addition to the multinomial source monitoring model described and used in the previous experiments there are also item and source detection probability parameters as well as guessing parameters for two sources. Some basic psychological assumptions are connected with this model. It is assumed that the memory for one source dimension is not independent from the other in the sense that the recollection of one dimension may trigger the recollection of the other. Additionally, it takes different guessing strategies into consideration, so, that the guessing parameters of the first dimension are not independent from the guessing parameters of the second dimension.

The parameter D in the multinomial model presented in Figure 20 denotes the probability of item and distractor recognition. If the items of a special source combination

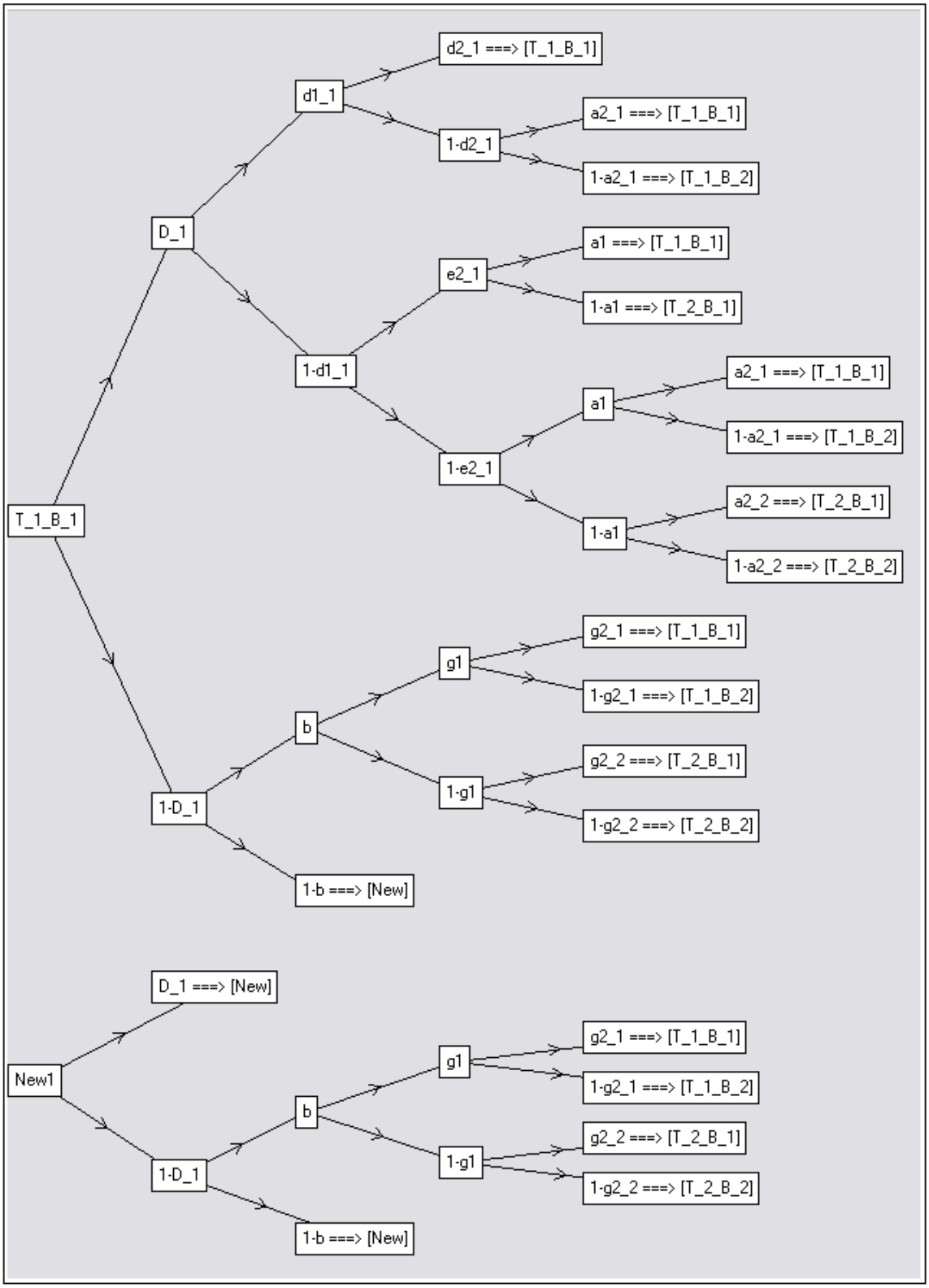

Figure 20. Example of the multinomial model for crossed dimensions of source information with target person 1(T_1) and background 1 (B_1) as root sources

were not identified as *old* or *new* with the probability *1-D*, they are guessed *old* with the probability *b* and *new* with the probability *1-b*.

If the items were identified, the source information from the first source dimension is recollected with the probability *d1*. If the first source dimension is recollected, the source for the second source dimension is recollected with the probability *d2*. If the first source dimension was not identified with the probability *1-d,* the second source is recollected with the probability *e2* and not recollected with the probability *1-e2*. If the second source dimension was recollected with the probability e, the first source of the first source dimension is guessed with the probability a1. The second source of the first source dimension is guessed with the probability *1-a1*.

If neither the first nor the second source dimension were recollected, the first source of the first source dimension is guessed with the probability *a1* and the first source of the second source dimension with the probability *a2*. The second source of the first source dimension is guessed with a probability *1-a1* and the second source of the second source dimension is guessed with *1-a2*.

If the items or the distractors were not identified, they are guessed *old* with the probability *b* and *new* with the probability *1-b*. If items or distractors were guessed *old*, the first source of the first source dimension is guessed with the probability *g1*. If the first source for the first source dimension was guessed with the probability *g1,* the first source of the second source dimension is guessed with the probability *g2* and the second source of the second source dimension is guessed with the probability *1-g2*. The second source of the first source dimension is guessed with the probability *1-g1* and if so, the first source for the second source dimension is guessed with the probability *g2* and the second source is guessed with the probability *1-g2*.

Differing from the original model by Meiser and Bröder (2002) the memory parameters for distractor item detection were set equal to the item detection parameters. The parameters for the probability of remembering a source on the second dimension, given that source on the first dimension is not remembered (parameter *e2*), were set equal with the memory parameter for the second dimension given the source was remembered *d2*. The source guessing parameters (parameter *g1* and *g2*) - reflecting the probability that the items were not identified but guessed *old* and therefore the sources were also guessed - was set equal with the source guessing parameters under the precondition that the items were recollected (parameter *a1* and *a2*).

This resulted in a model with ten degrees of freedom, which revealed the following fit statistics for the whole data (see Table 4 for an overview): negative items under load: $\chi^2(10) = 11{,}43$, $p = .325$; negative items with no load: $\chi^2(10) = 16{,}35$, $p = .09$; positive items under load: $\chi^2(10) = 15{,}93$, $p = .1$; and positive items with no load: $\chi^2(10) = 7.55$, $p = .67$.

For the first 24 items the model shown the following fit statistics: Negative items under load: $\chi^2(10) = 17{,}7$, $p = .06$; negative items with no load: $\chi^2(10) = 12.08$, $p = .28$.; positive items under load: $\chi^2(10) = 20.75$, $p = .02$.; and positive items with no load: $\chi^2(10) = 7.33$, $p = .69$. For the last 24 items the model revealed the following fairly well fit statistics: Negative items under load: $\chi^2(10) = 4.09$, $p = .94$; negative items with no load: $\chi^2(10) = 9.77$, $p = .46$; positive items under load: $\chi^2(10) = 11.17$, $p = .34$; and positive items with no load: $\chi^2(10) = 9.01$, $p = .53$.

		Full		Phase 1		Phase 3	
		χ^2	p	χ^2	p	χ^2	p
Negative	Load	11,43	.33	17,7	.06	4,09	.94
	No load	16,35	.09	12,08	.28	9,77	.46
Positive	Load	15,93	.1	20,75	.02*	11,17	.34
	No load	7,55	.67	7,33	.69	9,01	.53

Table 4. χ^2 and p values with 10 degrees of freedom for the multinomial model of Experiment 3 for the complete presentation, phase 1 and phase 3.

The hypotheses were as follows: An inconsistency advantage for context information particularly in the first presentation phase was assumed. Where the assumptions by Macrae and colleagues (1999) predict a *consistency* advantage for the target person under load, the assumptions and results by Ehrenberg and Klauer (2005) predict an *inconsistency* advantage for the target person. Where the EFM suggest an *inconsistency* advantage for both the target person and the irrelevant context information (as a consequence of automatic attention reallocation under load that remains stable over the impression formation process) the *meaning-seeker*-assumption states an inconsistency advantage for both the target person and the context information as consequence of a strategic search for the reasons for the inconsistency. In sum, it is expected to find an inconsistency advantage for irrelevant context information and the target person. Moreover, it is assumed that this inconsistency advantage will be different for the various presentation phases.

These assumptions were tested by model restrictions of the multinomial model for crossed source information. A good fit of the whole model is supposed if the χ^2-distributetd goodness-of-fit-index G^2 is not significantly different from zero. It is assumed that an impact of the theoretical constructs behind the parameters is reflected in difference between the corresponding parameters so that the statistical equation of two parameters leads to a significant deterioration of the model. According to the hypotheses the assumption was tested that the probability of the detection of an item or a distractor for consistent and inconsistent items is of the same quality (manifested in the first equation below a). Further, the assumption was reviewed that the source memory for the target person is equal for consistent and inconsistent information for all conditions (equation b) and that the source memory for irrelevant context information is the same for consistent and inconsistent information (equation c).

Because of the extraordinary complexity of the model the assumption for the conditions of the presentation of negative items under load, of positive items under load, of negative items without cognitive load, and positive items without cognitive load and again for the differences between the whole data, Phase 1, and Phase 3 were tested separately.

a) $D_{consistent} = D_{inconsistent}$

b) $d_{target\ person\ |\ consistent} = d_{target\ person\ |\ inconsistent}$

c) $d_{context\ |\ consistent} = d_{context\ |\ inconsistent}$

5.4.3 Results and discussion

Item Memory A previous test (as a kind of manipulation check for the cognitive load task) of the load/ no load differences in item memory revealed significant differences for the whole data but the analysis of the phases failed because of an ill-fitting multinomial model after equalisation.

The hypothesis of equality for consistent and inconsistent item information (a) is supported by the data in all conditions (valence, load, phases) except the no load/positive condition for the whole data, where we find a small inconsistency advantage ($\Delta\chi^2(1) = 4.04$, $p<.05$; see Table 5 for all ratio statistics). For phase one, also a substantial inconsistency advantage in the load negative condition ($\Delta\chi^2(1) = 12.39$, $p<.05$; see Figure 21) was revealed.

	General	Phase one	Phase three
a)	$\Delta\chi^2$	$\Delta\chi^2$	$\Delta\chi^2$
Load / negative	1.77	12,39*	2.51
No load / negative	1.07	.53	.01
Load positive	2.68	n.e.	0
No load / positive	4.04*	3.81	.17
b)			
Load / negative	2.53	.71	2.37
No load / negative	0	.3	.76
Load positive	.85	n.e.	.94
No load / positive	.05	.3	.14
c)			
Load / negative	3.93*	4.45*	.28
No load / negative	.86	.69	.12
Load positive	.77	n.e.	1.67
No load / positive	1.02	.85	1.29

Note: n.e.= no evaluation possible

Table 5. Values of $\Delta\chi^2$ for sub-models of the Multinomial Memory Model for Experiment 3 degrees of freedom = 1.

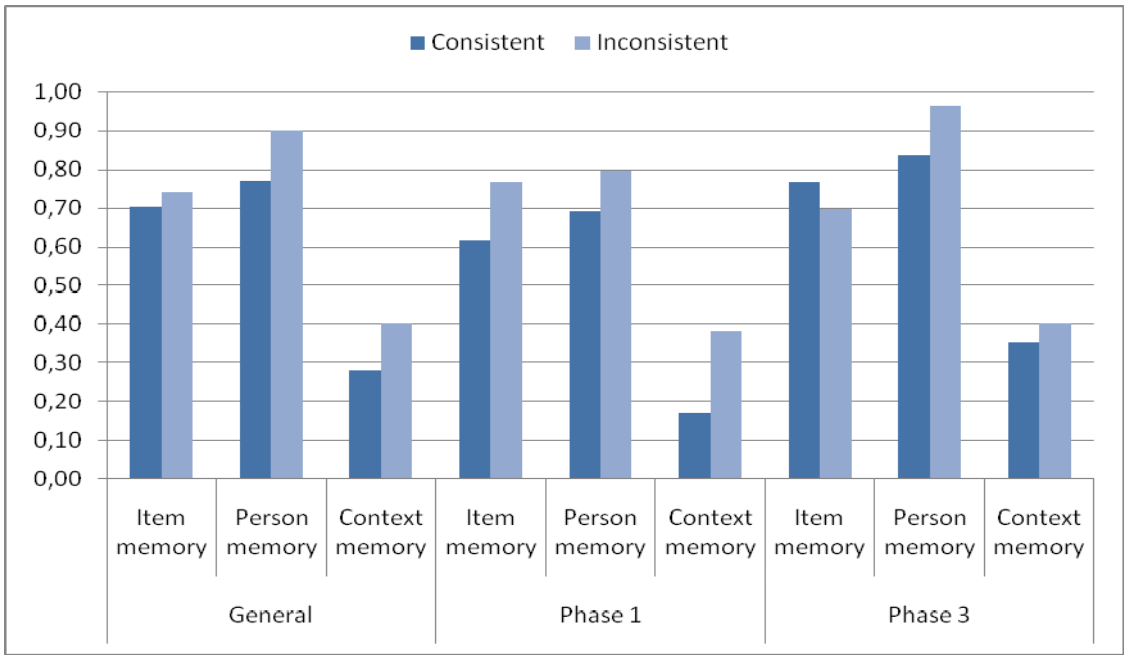

Figure 21. Item-, person- and context memory in the load condition of Experiment 3 as a function of negative consistent and inconsistent item information and presentation phase

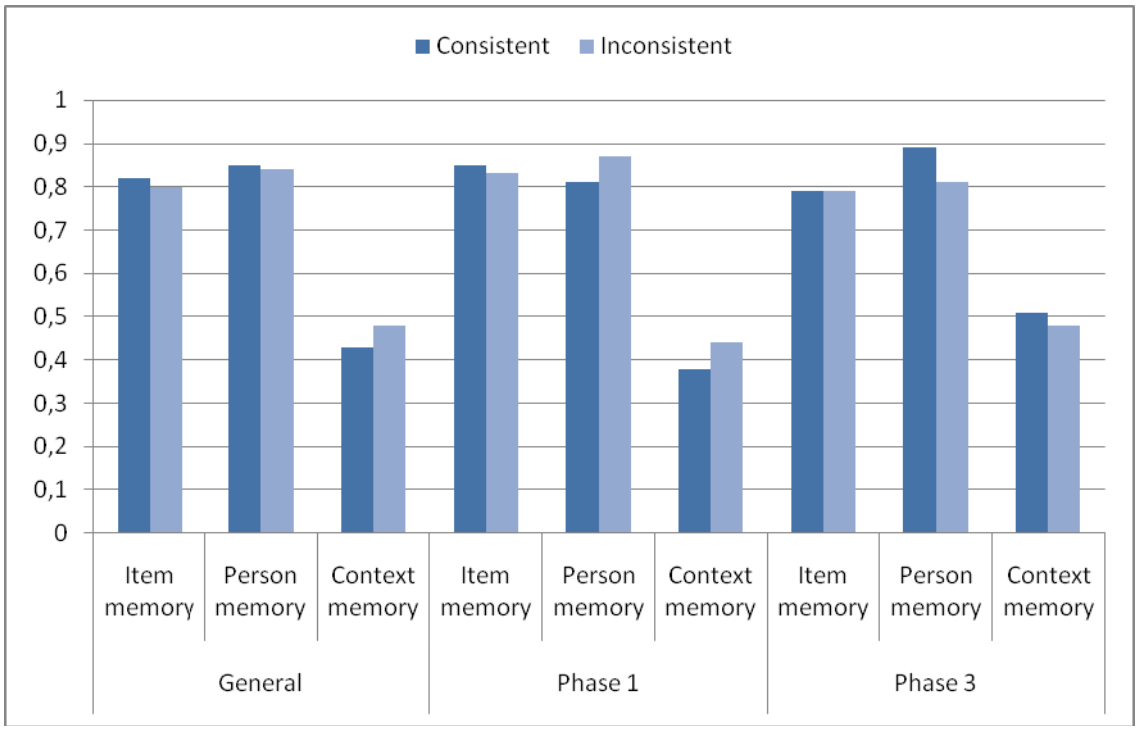

Figure 22. Item-, person- and context memory in the no-load condition of Experiment 3 as a function of negative consistent and inconsistent information and presentation phase

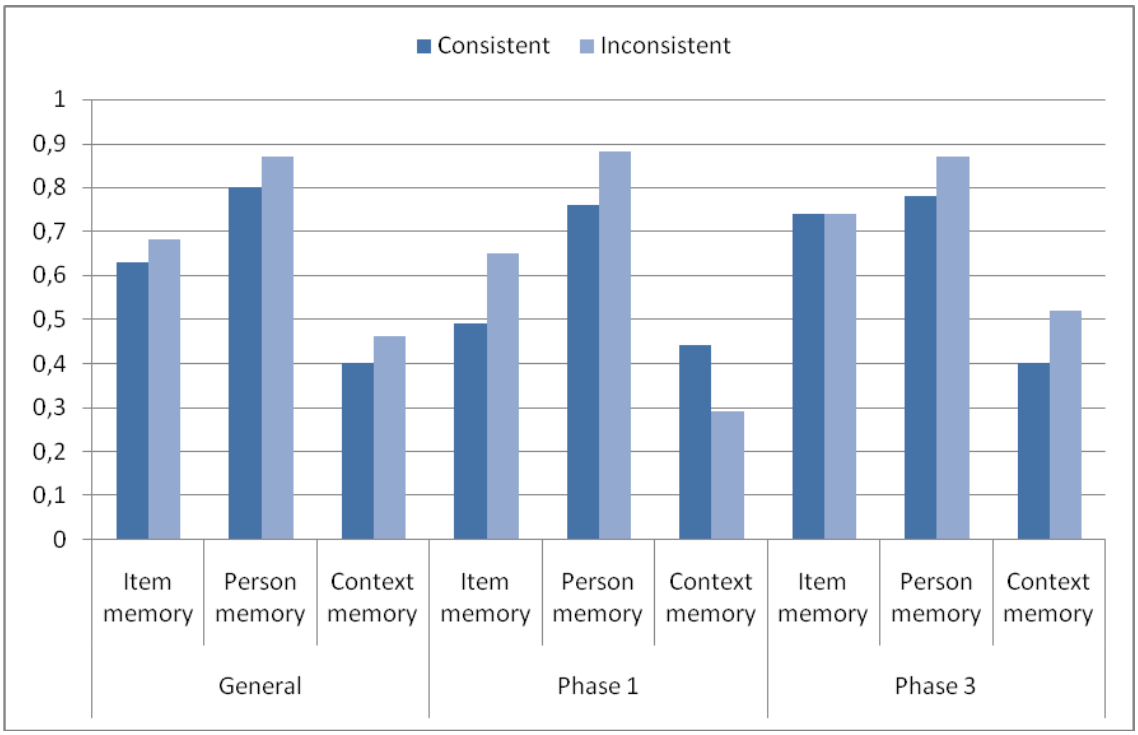

Figure 23. Item-, person- and context memory in the load condition of Experiment 3 as a function of positive consistent and inconsistent information and presentation phase

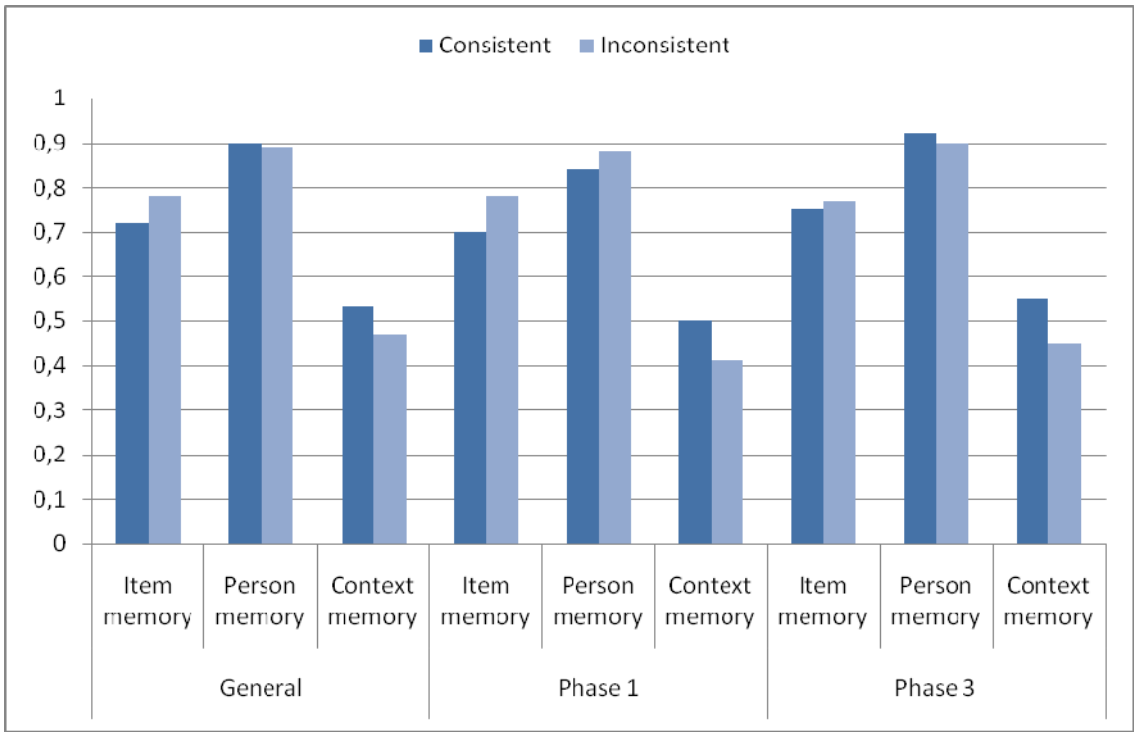

Figure 24. Item-, person- and context memory in the no-load condition of Experiment 3 as a function of positive consistent and inconsistent information and presentation phase

Source memory The separation of memory for the target person and memory for the context (c) resulted in significant inconsistency advantages for the *context* in the load/negative condition of phase 1 ($\Delta\chi^2(1) = 4.45$, $p < .05$) and for the whole data ($\Delta\chi^2(1) = 3.93$, $p < .05$).[4] Although the values for memory of the *target person* (b) in the load negative condition lie in a critical array they even do not reach significance (see Table 5) yet. The memory for the target person in general is very good and oscillates in the region of .9 whereas the memory for context information ranges from .3 to .5., a fact that speaks for a ceiling effect. In direct equation tests of the load vs. no load conditions no significant differences were found neither for memory of the target person nor memory of irrelevant context information.

5.4.4 Summary

Despite the fact that the highly complex multinomial model for crossed source information was combined with nonetheless complex experimental conditions it was possible to obtain some fundamental findings. The well-known inconsistency advantage turned out to be a consistency *disadvantage* for the irrelevant context information, again. This effect also appeared for the first segment of the impression formation process but not the last, where

memory for consistent information reached equivalence with inconsistent information, which is normally very stable on a high level. These findings are very well compatible with the EFM. However, the disappearance of the inconsistency advantage in the last part of the impression formation process – as found twice before – and the lack of a difference in memory for the target person's consistent versus inconsistent behaviour in direct comparison argue against the assumption that the inconsistency advantage is the consequence of an arbitrary and rather automatic attention reallocation process.

The improvement of memory for consistent information during the impression formation process, as found also in the 1st and the 2nd Experiment, supports the assumption that a social category leads the encoding of information in the initial part of the impression formation but the bad fit of behaviour and social category encourages *meaning-seeking*-strategies.

It is important to note, that the findings are tainted with some major limitations which reduce their potential for generalization. The combined complexity of the research question and the multinomial model required the distribution of tests to several steps. The difference in memory for consistent and inconsistent information also resembles a difference between the target persons because the direct comparison was only made in one of both valence domains combined with one of both cognitive load conditions.

Hence, the negative information about the physician compared to negative information about the prostitute leading to better memory for irrelevant context information such as screen position under load speaks in part for the EFM – although it has to be state that this effect is limited to negative information conditions if information about more than one person is presented. This could be interpreted with the complex competitive character of the given task: forming an impression of two oppositely stereotyped target persons compared to only one person. The fact that there is no significant difference for the memory of the target person suggests that the storing of contextual details of inconsistent information is not an automatic process that counts for every single piece of perceptual/contextual information as suspected by Sherman et al. (1998, 2004). Maybe the obtrusiveness of contextual information has to be considered as an explanation for the unexpected stereotype inconsistency advantage in inconsistency resolution attempts. The degradation of the stereotypical label of the target person is suggested by the vanished difference between memory for perceptual details of consistent and inconsistent information in the last segment of the impression formation process. A possible objection, that the context may have served as special indication for the

difference between consistent and inconsistent information does not explain the inconsistency advantage in the initial segment of the encoding process.

Memory for the target person being remarkably good during the impression formation process indicates an excellent ability of the participants to differentiate between the target persons and an individuation of the behaviour descriptions from the first impression onward – but, unfortunately, it does not allow any conclusion concerning load effects on inconsistency-based individuation. The collected data also revealed an inconsistency advantage for item information in a (positive) no load condition and in a negative/ load condition suggesting a tendency for enhanced encoding of inconsistent information independent from any cognitive load manipulation. This indicates, that if expectations originating from social categories are violated (i.e. bad fit), the motivation to find a meaning for the violation will remain unaffected by cognitive load.

A main limitation for the freehanded interpretation of the findings in favour of the adapted anticipation strategy remains the objection that the influence of cognitive load on the encoding process decreases over time, also regarding the findings of a significant effectiveness of the load manipulation only for unsegmented data.

5.5 Experiment 4

5.5.1 Introduction

The results of first three experiments may be interpreted in the frame of the assumptions of the encoding flexibility model but with some main limitations. Consistent with the EFM an inconsistency advantage was found that applied to completely irrelevant context information as predicted by the EFM. Consequently, it can be assumed that the inconsistency advantage – or better the consistency *disadvantage* – for irrelevant context information under scarce cognitive resources is the consequence of an automatic attention reallocation process. But the disappearance of this inconsistency advantage/consistency disadvantage in the last part of the impression formation process – as found twice before – and the formerly attested lack of any difference in memory for the connection of the target person and her consistent versus inconsistent behaviour in the direct combination of the two source dimensions speak against the assumption that the inconsistency advantage is a consequence of an involuntary, automatic attention reallocation process.

Another interpretation of the inconsistency advantage may be the general search for meaning and guidance in a complex and apparently unpredictable world. One dimension of guidance is categorisation. If categorisation fails, people start to search for an explanation for the failure of their categorical expectations and try to develop an alternative categorisations and predictions of upcoming information. In the context of the present experimental paradigm people may develop hypotheses about the presentation of the behaviour descriptions on different screen positions, in particular when they are surprised by this kind of presentation of information. Participants may conclude that there is a meaningful connection between the behaviour descriptions and the presentation on different screen positions. Particularly under conditions of scarce cognitive resources the screen position may serve as prediction for the inconsistency of the behaviour if the prediction by the target person's social category fails.

However, if the participants are explicitly informed of the manner of presentation on different screen positions and the arbitrary character of valence of the behaviour descriptions they may not include the irrelevant context information into their meaning seeking considerations. Additionally, if the participants are told to expect different kinds of behaviour descriptions they may not develop any kind of inconsistency advantage at all.

These questions were tested by informing the participants at the start of the experiment that the behaviour descriptions will be shown on different screen positions and that this is an

attention focussing requirement. In a second condition the participants were informed of the fact that the valence of the behaviour description is unrelated to the screen position.

According to the EFM, the inconsistency effect for irrelevant context information will appear, despite the explicit information, because of the automatic, nearly instinctive character of the attention reallocation process described by Sherman and colleagues (1998) and Förster and colleagues (2004). Following the meaning-seeker-hypothesis, the inconsistency advantage in source memory will disappear as a consequence of previous instructions, because the latter causes the context information to lose its predictive value.

5.5.2 Method

The 4th experiment 2 (source: physician vs. prostitute) x 2 (screen position: left vs. right) x3 (target valence: positive, negative, neutral) x 3 (presentation phase: first 16 items, second 16 items, third 16 items) mixed design with repeated measures on the least three factors.

Participants 62 students at the Friedrich-Schiller-University Jena/ Germany were given 7 € for their participation in the Experiment 4. The experiments were run in sessions of a maximum of five participants.

Materials and Procedure Materials and procedure were exactly the same as in Experiment 2 with two small exceptions. After the general introduction of the target person the participants received special information of the following wording:

Condition 1: "To stabilise and to focus your attention to the particular behaviour description they will be presented alternately on a right and on a left screen position. Earlier studies in person perception revealed, that automatic focussing can be optimized by changing the positions."

Condition 2: "Because of that the behaviour description will be randomly assigned to a screen position. The content of the behaviour description is not connected to the screen position"

The participants were randomly assigned to both conditions so that 31 participants were in Condition 1 and 31 participants in the Condition 2.

Furthermore, direct comparison of load and no load conditions was omitted because of the constriction of the inconsistency advantages in source memory to load conditions. Subsequentially, all participants received a cognitive load exposure.

Data analysis Exactly the same multinomial model as in Experiment 2 was employed and this resulted in a model that fitted satisfactorily well for the complete data of Condition 1: $\chi^2(4) = 2.45$, $p < .65$ and Condition 2: $\chi^2(4) = 5.14$, $p < .27$, and also for the phase separations particularly for condition one phase one: $\chi^2(4) = 2.27$, $p < .69$.

It was assumed that there is a consistency disadvantage for the source memory in both conditions – particularly for Phase 1. The inconsistency advantage was expected to decrease over the presentation phases. It seems also quite plausible to expect a consistency disadvantage for item memory – as discovered in Experiment 1 and 3.

So we tested the following restrictions for all phases and conditions

a) $D_{consistent} = D_{inconsistent}$

b) $d_{consistent} = d_{inconsistent}$

5.5.3 Results and discussion

Item Memory A significant consistency disadvantage for item memory in Phase 1 of condition 1 ($\Delta\chi^2(1) = 12.93$, $p < .05$; see Table 6) was discovered. In all other conditions and phases including the whole data were no differences discernible, even in comparison tests of the phases 1 and 3 were only minor but no significant differences detectable ($\Delta\chi^2(1) = 3.61$, $p = .06$).

Source memory For source memory we found no significant differences.

Source guessing One totally unexpected result was the inconsistency advantage for source guessing. Accordingly, the following post hoc effects were tested:

c) $a_{consistent} = a_{inconsistent}$

They revealed significant inconsistency advantages for the presentation phases 1 and 3 and the whole data in condition 1 but not for condition 2 and phase 2 in condition 1. These unexpected results may be explainable in the context of the semantic processing of the information and the strategic information processing.

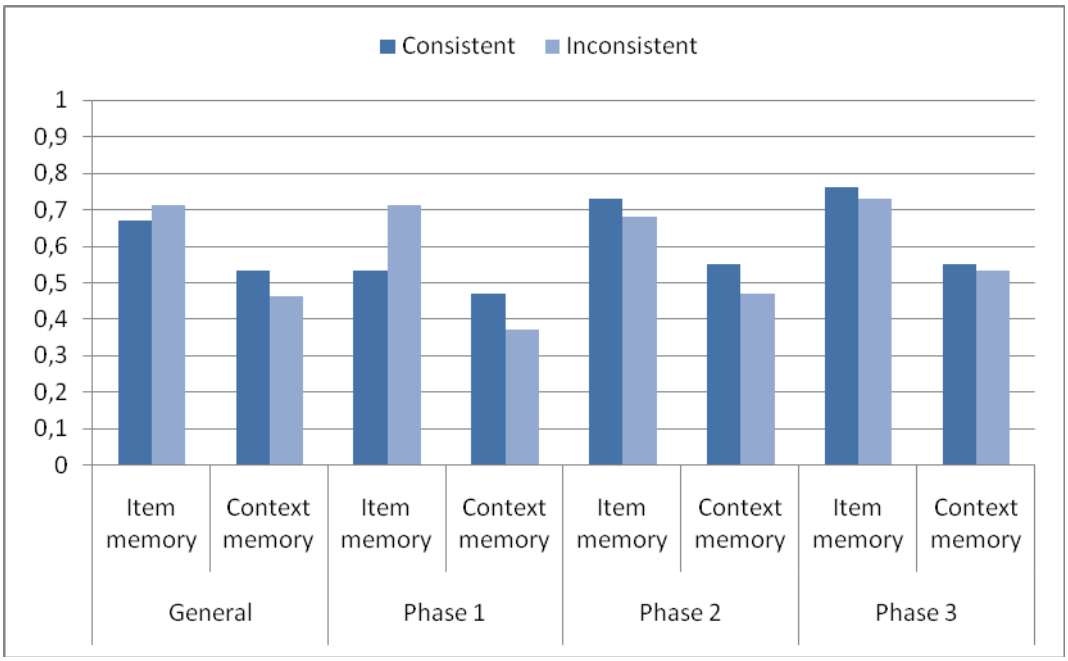

Figure 23. Item and context memory in Experiment 4 as a function of consistency and presentation phase in Condition 1

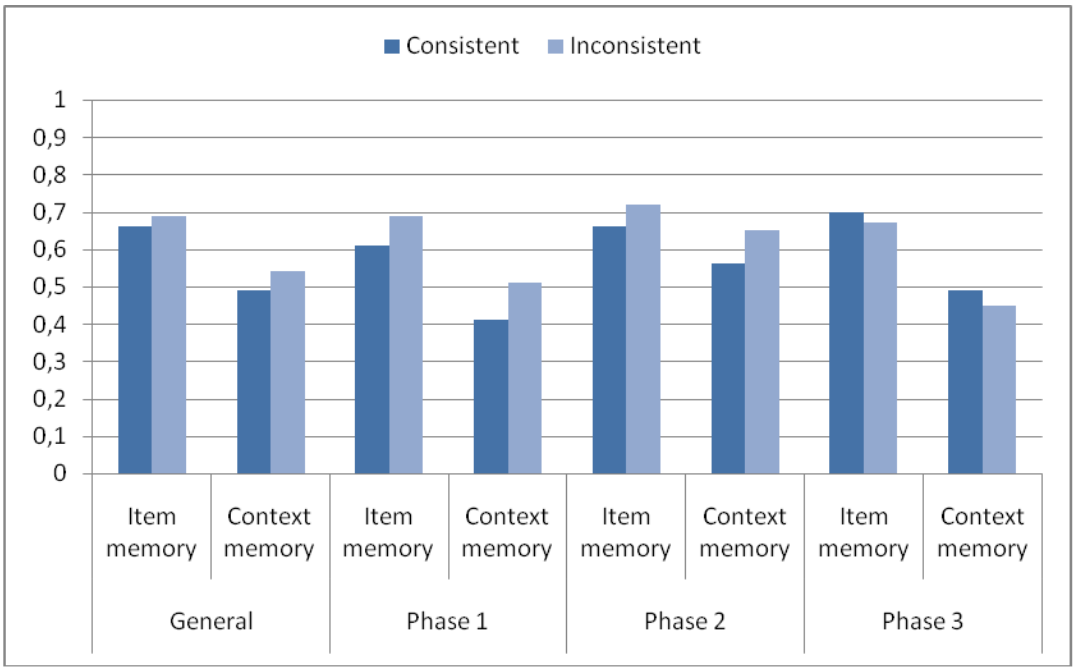

Figure 24. Item and context memory in Experiment 4 as a function of consistency and presentation phase in Condition 2

	General	Phase one	Phase two	Phase three
a	1,20	12,93*	1,18	0,61
b	1,00	0,65	0,46	0,01
c	8,10*	5,69*	2,82	4,69*

Note. * p< .05;

Table 6. Values of $\Delta\chi^2$ for sub-models of the Multinomial Memory Model for Experiment 4 and df=1.

5.5.4 Summary

Taking these final results into account, the hypothesis concerning the automaticity of the attention allocation process is supported. It can be concluded that the awareness towards contextual details of inconsistent information is not necessarily an automatic process without the perceiver's awareness as assumed by Macrae (1994), Sherman (1998) or Förster (2004) but rather hypothesis directed. Noticeable contextual circumstances will be considered, may they be irrelevant to the personal impression formation or not and regardless of cognitive load. Presumably, the effect is motivated by the desire to explain unexpected information and to allow a cue-guided recategorisation, i.e. the adaptation of the continuous anticipation. If irrelevant context information is ostensibly introduced as a functional purpose, the awareness towards these details becomes consistency-independent. However, memory for inconsistent behaviour descriptions is enhanced in the primary phase and disappears in the latter phases. This consistency disadvantage – which is unfortunately not significant in direct comparison of the phases 1 and 3 – can be reckoned another support for the assumption, that recategorisation or individuation takes place during the impression formation and that the anticipation is continuously adapted.

In conditions where the independence of the content of behaviour descriptions and context information is frankly introduced (Condition 2), the previously found advantage for contextual details of inconsistent information is absent again and previously discovered inconsistency advantages in item memory disappears. One explanation for this disappearance may be the mention of the fact that the behavioural information contains variable meaning.

Unfortunately, the results lack some explanatory power as a result of the omission of the direct experimental re-test of variables like default conditions (Experiment 2) without instructions and cognitive load within Experiment 4.

6 General discussion

6.1 Overview

The main aim of this doctoral thesis was the investigation of the encoding and memory for expectancy consistent and inconsistent information under circumstances of scarce cognitive resources in order to test the encoding flexibility model (Sherman et al., 1998) and to take a look at the characteristics of the process of impression formation as an adapted anticipation. The hypotheses were developed within the theoretical framework of the different understandings of a social perceiver as an *efficiency expert* (Sherman et al., 2004; Sherman et al., 2000; Macrae & Bodenhausen, 2001) compared to the concept of the social perceiver as a *meaning seeker* (Spears & Haslam, 1997; Nolan et al., 1999; Oakes & Turner, 1990). In search for a better model of the social perception process the application of cognitive load was a frequently used paradigm. A previously presented stereotype in combination with cognitive load led to the enhanced application of stereotypes (Gilbert & Hixon, 1991; Bodenhausen, 1990; Bodenhausen & Lichtenstein, 1987; Macrae et al., 1994) and therefore a stereotype-consistent information advantage in encoding, judgement, and memory. Nevertheless, there are findings of no effect of cognitive load on stereotyping as a consequence of a poor fit of stereotype and behavioural information (Nolan et al., 1999) and findings of the enhancement of memory for context details of stereotype-inconsistent information even under cognitive load conditions (Ehrenberg & Klauer, 2005; Sherman et al., 2004). Together with assumptions of shifted categorization and subtyping in the face of disconfirming exemplars of a stereotyped social category (Kunda & Oleson, 1995) these findings raise two main questions.

At first: Whether a stereotype is an independent cognitive instrument, which we can freely choose to use or not to use or if stereotyping is an inevitable characteristic of human nature.

And secondly: Whether the application of a given stereotype is an inevitable, automatic process, primarily occurring under circumstances of scarce cognitive resources, or if the stereotypical perception process is strategically and dynamically adapted to the relevant information in search for meaning – relatively unaffected by demands of cognitive load.

Relying on the widely used person perception paradigm employing the presentation of a set of behaviour descriptions about a target person belonging to a highly stereotyped social category at first it was hypothesized that, according to the encoding flexibility model (Sherman et al., 1998), the memory for irrelevant details should be better for stereotype-inconsistent information than consistent information. Secondly, it was hypothesized that this inconsistency advantage diminishes during the person perception due to a continuous expectation adaptation process in the face of the increasingly weaker fit of the stereotype connected with the social category of the target person and the highly contradictory behavioural information.

Contrary to Sherman and colleagues (Sherman et al., 1998; Sherman et al., 2004) systematically peculiar but irrelevant perceptual details of inconsistent information are not assumed as automatically and passively stored for later inspection but strategically used to make sense of the perceived environment. The increasingly diminished memory difference for perceptual details presented together with consistent and inconsistent information was expected to be a consequence of an individuation/inconsistency resolution process, which – contrary to Macrae and colleagues (Macrae et al., 1994) – is independent from the presence of additional tasks. Associated with these primary theoretical considerations were secondary hypotheses especially tested with the different arrangements of the four experiments discussed hereafter.

The primary aim of the 1st experiment was the replication of results by Ehrenberg and Klauer (2005), who were able to show an advantage in memory for a target person if stereotype-inconsistent behavioural information was presented under cognitive load. Ehrenberg and Klauer interpreted their results referring to the encoding flexibility model (Sherman et al., 2004), where it is assumed that perceptual context information of inconsistent behaviour is stored in memory for later inspection in cases of sufficient resources. The 1st experiment of this dissertation was guided primarily by these assumptions with the additional investigation of data on different impression formation stages, with different amounts of information and increasingly stereotype contradictive behaviour indicating a weak fit of social category of the target person, and her behaviour (Nolan et al., 1999).

Surprisingly, the predicted inconsistency advantage in memory was not only found in source memory but also for item memory and even under conditions without cognitive load. These effects were strongly valence-dependent, indicating that the presentation of two target persons leads to contrasting effects. The supposed disappearance of the inconsistency

advantage for source memory was statistically not confirmed but the initial consistency disadvantage in item memory vanished in the 2nd and 3rd stage of the impression formation process. These results raise the question if the adopted cognitive load manipulation was appropriate for the paradigm even though the manipulation check – the general effect of cognitive load on item memory was significant – showed the anticipated results in the first two stages. The replication of parts of the experiments carried out by Ehrenberg and Klauer poses the question if the assumption of a shift of attention from consistent towards inconsistent information in presence of a stereotype under cognitive load is a necessary supposition. The advantage in memory for perceptual details of inconsistent information is not necessarily bound to an attention-split-process because consistent and inconsistent information did not stand in direct competition for attention.

Inconsistency advantages in source memory under load argue against the assumption by Macrae and colleagues (1999) that inconsistency advantages are consequences of the act of individuation – because individuation is understood as very resource-consuming. The assumption that inconsistency advantages are a consequence of a basic attention shift towards perceptual details of inconsistent information cannot yet be decided after the first experiment, because the individuation assumption did not prove completely wrong. A diminishing memory advantage for inconsistent behaviour of target persons and a very good memory for the target person in general could be an indication for an act of load-independent individuation and inconsistency resolution during the impression formation process. The remaining consistency disadvantage in source memory in all stages of the impression formation process does not necessarily indicate a general attention shift to mere perceptual details of inconsistent information. On the contrary, the load effect on consistent rather than inconsistent information (even under cognitive load conditions) maintains the individuation assumption within the framework of the *meaning-seeker*-hypothesis proposing a load-independent search for accuracy in social perception.

The main aims of the 2nd experiment were the test of the encoding flexibility model with non-semantic information and the replication of the diminishing of the memory advantage for inconsistent information. Experiments by Sherman and colleagues (Sherman et al., 2004; Sherman et al., 1998) tested the assumptions concerning the inconsistency advantage in perceptual memory with a priming paradigm of pattern recognition. However, the presented behaviour descriptions were not independent information but allowed a direct inference from words to behaviour. Therefore, one aim of the 2nd experiment was to test the

assumptions of the EFM with a slightly altered experimental design including the presentation of only one target person and contextual information that was completely independent from the behaviour descriptions.

The findings by Ehrenberg and Klauer (2005) raised the question if the encoding of perceptual context information under conditions of constrained attention resources was an effect that was not automatically directed to current contextual details of the information but could be interpreted as resource independent individuation. In order to test the assumption of the EFM that source memory advantage is a general inconsistency effect under scarce cognitive resources and not due to cued recognition oriented on the target person or the behaviour description itself, completely non-semantic and behaviour-description-independent information was presented. In order to see if there is a load-unaffected individuation during the person perception process, the inconsistency effect differences in three successive segments of the impression formation were investigated.

The results of the 2nd experiment confirmed the hypothesis of memory advantages for independent and irrelevant contextual details of inconsistent information under conditions of scarce cognitive resources as predicted by the EFM. Contrary to the assumptions of the EFM the direct competition of consistent and inconsistent information for attention was not a necessary prerequisite. Furthermore, the hypothesis of diminished source memory advantage also received support by the results of Experiment 2. That this decrease of the difference between stereotype-consistent and inconsistent information is attributable to the increasing memory for contextual details of consistent information supports the assumption that there is a motivation for the integration of the any useful information in a mental representation of the present information particularly in confrontation with bad fit of the social category of the target person and the behavioural information. This implies that there is indeed a search for meaningful information that allows for alternative categorisation and new predications about the presented information. To the same degree as stereotypical information associated with the primed social category becomes less reliable as a tool for predictions about the target person, alternative explanations come into the focus of attention.

The main objective of the 3rd experiment was to test the general validity of the EFM accounting for an automatic attention reallocation process for different kinds of contextual information. According to the EFM and the findings of Sherman and colleagues (1998), Ehrenberg and Klauer (2005), and the previous findings and replications of this dissertation project, the memory for contextual details is independent from the content of this context

information. However, there are cases when context details become less relevant for information processing and memory. If the target person ceases to be a useful reference because of her entanglement with an increasingly worthless social category, conspicuous and systematically varying contextual details start to be taken into account as a pseudo-useful resource for desired recategorisation and adapted anticipation.

In order to test the assumption of the EFM that source memory advantage is a general and automatic attention reallocation effect and not directed to (pseudo)-relevant information strategically in order to allow a cue guided recategorisation, the memory advantage for inconsistent information presented with the target person and with completely unrelated information was surveyed. And again, in order to see if there is a load-unaffected recategorisation during the whole person perception process, the inconsistency effect differences in three successive segments of the impression formation were investigated.

The results of the 3rd experiment are multilayered not least because of the highly complex experimental design. The general results indicate a diminishing inconsistency advantage in memory for irrelevant source information but not for the target person. The very good load independent source memory speaks for an individuation. The increasing memory for contextual details of consistent information – as documented in Experiment 2 – again supports the assumption of a cognitive attempt to find a useful instrument for recategorisation. Again, there was a strong valence-dependent inconsistency advantage such as previously detected in Experiment 1. This indicates an attempt in the differentiation of the target persons.

The 4th experiment elaborated on the findings the findings of the Experiment 2 with an additional test of the assumption suggested by the EFM regarding increased attention towards irrelevant contextual details of inconsistent information as a result of an automatic, hence not strategic, attention reallocation process. If this is an inevitable process resulting from presenting stereotype-inconsistent information it must be independent form any prior knowledge or speculation about the possible relatedness of behavioural and contextual information.

In order to test these assumptions the original design of Experiment 1 was expanded by one small detail: Participants were directly informed about the irrelevance of the contextual information for the impression formation process. The first instruction informed the participants of the arbitrary presentation of the behaviour descriptions at different screen positions, and the second instruction made it absolutely clear that there was no connection

between the valence of the behaviour descriptions and the presentation at a particular screen position.

It appeared that already the first instruction concerning the – alleged - function of the presentation at different screen positions was sufficient for the complete disappearance of any inconsistency advantage in source memory. Only a small inconsistency advantage for item memory in the first phase of the segmented impression formation process left some room for the assumption of an individuation process. Unfortunately, the results lack full explanatory power because the experiment was not a direct replication of Experiment 2. Hence, one can only make an informed guess about the impact of the direct instructions about the arbitrary character of irrelevant contextual information, which are most likely to cause independent encoding of the behavioural and the contextual information. This proves to be correct that the attention reallocation towards contextual details of inconsistent information is not an inevitable, automatic process but rather a strategic process in search for meaning and useful categories, which allow the prediction of upcoming information.

Altogether, despite the substantial limitations of the experimental paradigm, the statistical analysis and the comprehensive results the main hypotheses were predominantly supported. The first hypothesis predicted that with lesser cognitive capacity (more cognitive load) the memory for irrelevant perceptual details of stereotype-inconsistent information is enhanced in comparison to the memory for the perceptual details of stereotype-consistent information. The results of the first, second and third experiment confirm this assumption.

The second hypothesis predicted that with an increased amount of information the initial memory advantage for perceptual details of inconsistent information under cognitive load disappears during the impression formation process. The effect of an initial inconsistency advantage in the first phase of the impression formation process that diminishes at least in the last phase was found in the first, second and third experiment. A direct test of the memory increase for consistent information only yielded significant results in the second experiment.

The third hypothesis predicted that the particular initial attention for contextual details of inconsistent information is omitted, if the context information is described as arbitrary and unconnected to the behaviour descriptions. To test this hypothesis was the main aim of the fourth Experiment and it appeared that the addition of a small detail (such as the instruction of the arbitrary screen position) resulted in the disappearance of the inconsistency advantage for contextual details of inconsistent information found in all previous experiments.

In synopsis, these results allow for a carefully considered integration of the theoretical assumption made in advance.

6.2 Strengths and limitations of the presented experiments

In this dissertation it was attempted to show that the models of stereotypes as *flexible and efficient tools* are limited by the assumptions that categorization and stereotyping are necessary components of human information processing and that the social perceiver is predominantly *a meaning seeker* while the *efficiency expert* comes a close second. Inconsistency advantages in memory for behavioural information under conditions of cognitive load and memory for irrelevant contextual detail of inconsistent information – even in long term memory – speak for the employment of *meaning-seeking*-strategies as primary instruments of social cognition. The quick abandoning of a different encoding of irrelevant contextual details as a consequence of the knowledge about their arbitrary character does also support the notion of an *efficiency expert*. So far, the discussed experiments do indeed not allow any final conclusion on the *meaning-seeker* vs. *efficiency-expert*-debate but provide an interesting insight into the functioning of a stereotypical impression formation process.

Moreover, the presented experiments suggest an extension of the assumptions of the EFM. A direct test of the long-term memory for semantically independent information combined with the behaviour description is a significant advancement of the investigations of the EFM. The repeated replication of the memory advantage for perceptual details of stereotype-inconsistent behavioural information, independent from parallel presentation of consistent and inconsistent information and that the shift of attention resources not necessary being a prerequisite of the inconsistency effect are other important result of the present experiments.

The direct investigation of the impression formation process, the segmentation of its course, and the finding of a disappearing inconsistency advantage over the impression formation process are further crucial advancements of the present study. Unfortunately, herein lie also its largest problems. Not only is the disappearance of the impact of the load manipulation not eliminated as an alternative interpretation for the effect of increasing context memory for consistent information. Additionally, the difference in source memory between the segments is not a result of a systematic experimental manipulation but an observation of the intrapersonal variations. However, the repeated observation of stable phenomena is nonetheless valuable, particularly because they were hypothesis driven and they encourage further experimental investigation.

Another limitation of the explanatory power of the present findings is the restriction of the consistency differences in memory in Experiment 1 and 3 to behaviour descriptions with

special valences. The behaviour descriptions were not separately analyzed for each target person but mixed. Therefore the inconsistency advantage for negative information cannot be clearly separated for each of the two target-persons. Consequentially, there is an inconsistency advantage for the negative information of the one target person compared to the negative information about the other.

It is also noteworthy that the effects of inconsistency advantages are not restricted to source memory but were also found in item memory – even a diminishing inconsistency advantage was found in item memory. But this finding must not necessarily be interpreted as a disadvantage, but as an indication for the diminishing value of the primed stereotypical label.

Despite the major limitations of the present study, some consistent results, such as the repeated finding of the predicted inconsistency advantages in source memory under circumstances of cognitive load and the diminishing of this effect, allow the cautious assumption that there is a reason for the advanced source memory and it might be an intensified search for discriminative features.

6.3 Theoretical links to stereotype change research

The assumption of an intensified search for and use of discriminative features in confrontation with disconfirming exemplars was recently investigated with nonsocial information by Deutsch and Fazio (2008). They found an increased attention towards features relevant to the identification of exceptions. Not only that, participants increasingly learnt to discriminate between the different classes of stimuli.

Stereotype change is traditionally described by three well-established models. The bookkeeping model and the conversion model (Rothbart, 1981) assume that the perceiver essentially tallies up confirming versus disconfirming information and modifies the stereotype accordingly, in a data-driven way (bookkeeping) or until a threshold amount of disconfirming information has been encountered (conversion). The subtyping model (Brewer, Dull, & Lui, 1981) assumes that the treatment of disconfirming information depends on the structure of that information. Strongly counterstereotypic individuals are grouped into a new subtype that is differentiated from the rest of the group. Slightly counterstereotypic individuals are assumed as affecting the perception of the whole group.

All these models are difficult to apply to the stereotype driven person perception process of only one or two individuals because they presuppose the perception of more than

one category member at a given instant. But nevertheless, there are links in the explanation of the obstruction of the stereotype change process. Most notably, the assumed possibility of subtyping on the basis of irrelevant features of disconfirming exemplars of a social category (Kunda & Oleson, 1995) highlights increased attention for potential discriminative features in presentation with stereotype-inconsistent information. Recent research in subtyping and bookkeeping (Queller & Smith, 2002; Deutsch & Fazio, 2008) also illustrated the dynamics in the learning process of stereotype change and postulated that a change is most likely with moderately disconfirming exemplars. This is consistent with the assumption of a recategorisation of an ongoing impression formation process: If the inconsistent information is only slightly deviant and alternates with stereotype confirming information, a substantial shift of stereotypical anticipation is not necessary. Strongly associated, similar stereotypical expectations are applied – whereas with a declining fit of social category and behavior the need for discriminative features rises and the categorization is shifted accordingly. This highlights the importance of as many typical and (slightly) disconfirming exemplars as possible (Richards & Hewstone, 2001; Hewstone, Hassebrauck, Wirth, & Waenke, 2000).

The main focus of the present doctoral thesis was on general cognitive motivations for accuracy of the mental representation compared to the need for an economic information processing and the role of these opposing tendencies in stereotype change. However, even accuracy and economics is susceptible to individual motivational differences and situational circumstances. Individual prejudice (Wyer, 2004), ingroup identification (Hutchison & Abrams, 2003) or situational demands like future accountability (Paolini, Crisp, & McIntyre, 2009) certainly influence accuracy as well as processing load management and thus stereotype change tendencies.

6.4 Future research

The investigation of stereotyping as a process with the particular potential to facilitate dynamic changes of the stereotypical expectation is widely neglected and practically nonexistent (Kunda et al., 2002; Kunda et al., 2003). In the detailed analysis of stereotyping processes under particular circumstances lies a major benefit for the understanding of adaptive changes in categorisation and the beneficial mechanisms of stereotype change. Important questions were raised with the procedural approach to stereotyping and we are only just beginning to answer them yet. The present dissertation allows only an initiatively view on the processing of stereotype-consistent and inconsistent information. The hypothesis of the

social perceiver as a – predominantly – strategic *meaning seeker* received some support, whereas the status of the *efficiency expert* is not yet solved.

The Experiments produced the expected results, which were partly in accordance with the EFM but also posed questions of automaticity regarding the attention reallocation process and of the necessity of the divided attention division between stereotype-consistent and inconsistent information. Answering the question if this automatic attention reallocation process is a necessary or just a sufficient condition of the encoding flexibility is a potential task for further research on the EFM. An additional account within the framework of the EFM worth the investigation is a procedural change in the supposed memory advantage for *conceptual* meaning of consistent information.

Another important role plays the different amounts and kinds of cognitive load. Future investigations should recognize the limited generalizability of particular effects of different manipulations of cognitive load (Nolan et al., 1999). Associated with this question is the observed but not systematically tested decreasing effect of cognitive load over the course of the impression formation process. This major objection against the recategorisation assumption can in fact be refused by parallel effects of cognitive load on item memory. However, the diminishing cognitive load effects leave room for alternative explanations of the diminishing source memory. Hence, the application of different manipulations of cognitive load would be a promising procedure. The investigation of impression formation processes concerning larger groups i.e. the combination of the "Who said what" paradigm with the person-perception paradigm (Klauer & Wegener, 1998) could contribute to the understanding of subtyping and stereotype change.

Finally, the stronger consideration of the perception process, the attention shift mechanisms, variations in motivation, memory and judgement depending on different amounts of consistent and inconsistent information, will allow a deeper understanding of the complex nature of the stereotyping process.

6.5 Conclusion

A flower pot falling from a roof in front of us, a person wearing a pompous hat, or a politician talking of tax cuts after the election – we sometimes find ourselves in situations, where we perceive something we did not expect. Our reaction is often surprise, we may be frightened, or sometimes we laugh, because the element of surprise – or expectancy incongruency as we could also call it – is one basic determinant of humour. The observation

of unexpected circumstances (for example person behaviour) often leads to curiosity (on our part) and an increased involvement in the particular situation combined with a desire to understand it – to solve the perceived inconsistencies. Many things/ impressions that we would at first describe as bizarre, grotesque, or suspicious can at the same time stimulate our curiosity or arouse our interest. Whole industries and advertisement in particular, rely on the curiosity effect of exceptional information, strange behaviour, or jokes.

Surprise as reaction to unexpected information requires a certain expectation to work. The frequently occurring everyday situations with a surprise element, in which we perceive expectancy inconsistent information often in a subliminal way, suggest an innate tendency to continuously anticipate future events. Furthermore, it implies that this continuous anticipation is permanently adapted by the integration of new information, thus creating a constant "stream of anticipation". We can ask, what is the underlying motivation for curiosity as reaction to the confrontation with unexpected information? It is the human want for comprehension, i.e. the desire to understand an incident. But what does "understanding" mean? "Understanding" stands for prediction. And predictability is the ability to (further) anticipate a future situation in the ever-changing present.

The process of dealing with inconsistencies is said to comprise several aspects, such as explaining inconsistencies "away" (Förster, Higgins, & Werth, 2004), instigating a causal reasoning process (Hutter, & Crisp, 2005) and/or to integrating contradictory information within an established knowledge structure (Pendry & Macrae, 1999) all of them expressing the notion "inconsistency resolution". It has been suggested that this inconsistency resolution may be impaired by the force of cognitive load (e.g., Garcia-Marques & Hamilton, 1996; Srull & Wyer, 1989). Findings in favour of the memory for inconsistent information are expected to yield opposite results when cognitive load is implemented in the experimental design.

Better or worse memory for inconsistent information is mostly investigated by direct comparison of both memory measures (consistent vs. inconsistent), but rarely by exploring the particular consistency domain itself and its change with the impression formation process. Researching these aspects might have clarified the assumptions about different kinds of information directly competing with each other.

Another hypothesis yet to be fully investigated assumes an inconsistency *advantage* (based on an inconsistency resolution) which will be impaired by cognitive load, but not necessarily a consistency *disadvantage* which might also be stronger under cognitive load.

These reflections are incorporated in the EFM: Under cognitive load we will find a consistency disadvantage in memory for the special domain of perceptual/contextual details of the particular information. On the other hand it is expected that there is a consistency advantage in the encoding of conceptual information.

What is not considered by the EFM is the potential change of expectations during the impression formation process so that the differences between both memory domains disappear. Even the vertically (meaning a particular occasion, a point in time) inhibited inconsistency resolution and individuation process may evolve their power horizontally (on many occasions, pieces of behavioural information) during the process of impression formation, so that formerly consistent information is no longer clearly consistent and inconsistent information no longer necessarily inconsistent.

Some researchers assume that the inconsistency-related attention reallocation towards perceptual details is an evolution-based (Sherman, 2001) or neuronal-based (Förster, Higgins, & Werth, 2004), nearly inevitable, automatic vigilance process which might not be impaired but sometimes triggered by cognitive load, somewhat contradicting the notion of the assumptions of strategically controlled processing of inconsistent information. Together with Sherman and colleagues it is assumed that participants have a better memory for meaningful but unrelated contextual details of inconsistent information, but the explanation of this effect differs from the explanation by Sherman and colleagues. In this dissertation thesis it is assumed that contextual information is not passively stored in memory for "later use" but always processed and consulted to explain the inconsistency and hence to adapt the anticipation of the upcoming information - which is not necessary for consistent information. Here global strategies are at hand such as spontaneous trait inferences and corresponding guessing, which potentially loses its impact with less referential value of the stereotypical label.

Many consistency advantages can be explained by guessing strategies. Similarly, spontaneous trait inference (Wigboldus et al. 2003, 2004) can be understood as an attempt to simplify the situation at the momentary expense of accuracy and preferably under conditions of cognitive load. But the encoding accuracy can increase during an impression formation process because it simply has to if the previous expectations do not fit the stereotypic label anymore.

Researchers in the field often use tool metaphors for stereotypes („energy-saving devices" Macrae et al., 1994; "Among the handiest tools in the social perceiver's kit", Gilbert and Hixon ,1991, p. 509; "The Knife that cuts both ways", Dijksterhuis, & van Knippenberg,

1996; “Flexible cognitive tools” Sherman, et al., 2004), but considering all the information we have about the facts of stereotyping, in stereotyping ourselves we misidentify the flexible encoder as a craftsman. Because *“Stereotypes work as enlightening gestalts as they supply perceivers with extra information”* (Yzerbyt, Corneille & Estrada, 2001) and may therefore serve as a very powerful and inevitable cognitive processing demand. And stereotypical labels, often misunderstood as “stereotypes”, may only serve as – sometimes misguiding – guideposts for the stereotypical anticipation and individual information enrichment process.

When we walk a street where once a flower pot fell from a roof in front of us, we certainly remember the contextual details of this expectancy inconsistent information. We remember the streets, we remember the houses. But what we experience as memory is in fact ongoing anticipation. The search for explanations of exceptional events in memory is indeed an act of recategorisation or adapted anticipation. When we try to find a (alleged) contextual cause for this extraordinary incident, we may come to the conclusion that some “higher power” or “god” caused the flower pot to fall down in exactly that moment when we walked this particular patch of the street. Since these overgeneralised pseudo-explanations miserably fail in every instance and particularly in the explanation of falling flower pots and never enable the person experiencing such an event to either foresee or explain the world better than in the first place, further investigation search of the surroundings appears promising. It is beneficial because it yields a recategorisation, i.e. an adapted anticipation of the formerly common street. We could for example realise, that the house the flower pot fell from is an old people's home, hence we are able to generalise the experience not to streets in general but to re-stereotype streets with homes for the elderly as dangerous “flower-pot-streets”.

It is reasonable not to change the overall expectation of streets and not to collect a huge amount of individual expectations for exceptions of common streets but to permanently look – hypothesis guided – for reasonable causes and their regularities in events or even to experimentally test them if possible, disregarding any parallel load. This allows the optimal continuous anticipation of and the adjustment to the regular world we live in and to exclude any superstitious or even “transcendent” supernatural “explanations”.

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Summary

The present dissertation is concerned with encoding of and memory for information that do or do not meet previously raised expectations or live up to them. The main focus of this dissertation is on the perception and recollection of certain information which are congruent or incongruent in reference to given social-stereotypical data.

Prominent hypotheses concerning stereotypic-schematically information processing assume that this is primarily motivated by the demand to save scarce cognitive resources. Contrary to this position is the assumption that stereotypic-schematically information processing is inevitable and that stereotypic-schematically cognition primarily follows a need for a coherent mental representation. A cognitive-load-independent correction of schematic expectations in cases of low fit between a stereotype and individual behavioural information must be possible, presumably with the aid of contextual information.

The encoding flexibility model (EFM) by Sherman and colleagues (1998) assumes a better memory for contextual details of stereotype-inconsistent information under circumstances of additional cognitive load compared to the memory for contextual details of stereotype-consistent information. Simultaneously, memory for the conceptual meaning of stereotype-consistent information is improved. Sherman and colleagues explain their results with a flexible stereotype-driven attention management as a consequence of cognitive load, in the sense of modeling of stereotypes to become tools for saving cognitive resources.

The continuum model of person perception (Fiske & Neuberg, 1990) considers recategorisation or individuation as a consequence of failed confirmatory categorisation – in case of stereotype-inconsistent information. This recategorisation happens with the aid of "emergent attributes" (Kunda et al., 1990), which can be semantically irrelevant. Recategorisation and individuation are considered as dependent on sufficient cognitive resources (Yzerbyt et al., 1999; Macrae et al., 1999).

In cases when stereotypic-schematically cognition is corrected independently of available resources the memory advantage for perceptual details of stereotype-inconsistent information should diminish during the perception process.

To test these assumptions four experiments were conducted. The results support the assumption that encoding flexibility indicates the attempt to achieve appropriate recategorisation. The findings by Ehrenberg and Klauer (2005) and their replication in Experiment 1 included in this research allow the supposition that the advantage in context memory for stereotype-inconsistent information is just simply an individuation effect. This

effect is facilitated by the cued recall of the target person because of the stereotypical knowledge about the behavior descriptions. A similar memory advantage for contextual details of stereotype-inconsistent behavior was also documented for stereotype independent, non-semantic information. That speaks for an automatic attention reallocation in the sense of the encoding flexibility model. The disappearance of the memory advantage for the person with the simultaneously reappearing memory advantage for the irrelevant contextual information in Experiment 3 together with the disappearance of memory advantages with the overt instruction concerning the arbitrary character of the contextual information in Experiment 4 argue for a strategically search for relevant information for the purpose of a recategorisation.

The idea of a recategorisation process is further supported by the reduction or even complete vanishing of a memory advantage for contextual details of stereotype-inconsistent information during the impression formation process. However, the effects described above should rather be interpreted as the reduction or even disappearance of a consistency disadvantage than a diminishing of an inconsistency advantage, because memory for contextual details of consistent information increased to a level comparable to the one for inconsistent information. Altogether, this suggests receding stereotypical expectations.

Taken all the results from the experiments carried out in the course of this dissertation project together, it can be concluded that stereotyping is best described as a resource-saving information processing strategy. But the primary task of this strategy is adequate information processing in conformity with reality rather than mere resource saving, as widely assumed.

Zusammenfassung

Die vorliegende Dissertation befasst sich mit der Enkodierung und der Erinnerung für Informationen, die zuvor erzeugten Erwartungen eines typischen Ereignisverlaufs entsprechen oder ihm zuwiderlaufen. Der besondere Schwerpunkt dieser Arbeit lag auf der Wahrnehmung und dem Gedächtnisabruf von Informationen, die sich kongruent bzw. inkongruent einer sozial-stereotypen Erwartung gegenüber zeigen.

Prominente Hypothesen über die Funktion der stereotyp-schematischen Informationsverarbeitung gehen davon aus, dass diese in erster Linie dem Zweck der effektiveren Nutzung begrenzter kognitiver Ressourcen dient. Dem wird entgegengesetzt, dass stereotyp-schematische Informationsverarbeitung unvermeidlich sei, denn die Nutzung einer bestimmten kategorial-schematischen Kognition basiere vor allem auf dem Bedürfnis nach korrekter Informationsverarbeitung. Infolgedessen müsse eine belastungsunabhängige Korrektur schematischer Erwartungen im Falle fehlender Übereinstimmung von individueller Verhaltensinformation und Stereotyp möglich sein, die unter Zuhilfenahme kontextueller Information erfolge.

Das Modell der Enkodierflexibilität (EFM) von Sherman und Kollegen (1998) geht davon aus, dass das Gedächtnis für perzeptuelle Details stereotypinkonsistenter Information unter zusätzlicher kognitiver Belastung im Vergleich zu perzeptuellen Details stereotypkonsistenter Information besonders erhöht sei, dass sich gleichzeitig jedoch das Gedächtnis für den konzeptuellen Gehalt stereotypkonsistenter im Vergleich zu stereotypinkonsistenter Information verbessere. Sherman und Kollegen führen dies auf ein flexibles, stereotypgeleitetes Aufmerksamkeitsmanagement aufgrund kognitiver Belastung, im Sinne der Modellierung von Stereotypen als Instrumente der Ressourcenersparnis, zurück.

Das Kontinuum-Modell der Eindrucksbildung (Fiske & Neuberg, 1990) sieht vor, dass eine Rekategorisierung bzw. eine Individuierung in Situationen fehlgeschlagener konfirmatorischer Kategorisierung – z.B. bei wahrgenommener stereotypinkonsistenter Information – möglich ist. Die Rekategorisierung kann unter Zuhilfenahme „emergenter Eigenschaften“ (Kunda et al., 1990), die semantisch irrelevanter Natur sein können, geschehen. Rekategorisierung und Individuierung gelten als abhängig von ausreichenden kognitiven Ressourcen (Yzerbyt et al., 1999; Macrae et al., 1999).

Für den Fall einer ressourcen-unabhängigen Korrektur kategorial-schematischer Kognition sollte sich der Gedächtnisvorteil perzeptueller Details stereotypinkonsistenter Information im Verlauf des Prozesses der Eindrucksbildung verringern.

Zur Prüfung dieser Hypothesen wurden vier Experimente durchgeführt, die zeigen, dass das Phänomen der Enkodierflexibilität als ein Ausdruck der Suche nach Anhaltspunkten für eine sinnvolle Rekategorisierung verstanden werden kann. Die Ergebnisse von Ehrenberg und Klauer (2005) und ihre Replikation in Experiment 1 dieser Dissertation lassen zwar einerseits vermuten, dass der Effekt eines Gedächtnisvorteils für perzeptuelle Kontextinformation ein reiner Individuierungseffekt sein könnte, der einen „cued-recall" der Targetperson anhand des stereotypen Wissens über die Verhaltensinformation begünstigt. Die Tatsache, dass der Gedächtnisvorteil für kontextueller Information stereotypinkonsistenten Verhaltens auch bei nicht-semantischen und zu der inhaltlichen Information in keinem Zusammenhang stehenden Information auftritt, spricht jedoch für eine automatische Aufmerksamkeitsreallokation im Sinne des Modells der Enkodierflexibilität. Die Aufhebung des Gedächtnisvorteils für die Person zu Gunsten eines Gedächtnisvorteils für die irrelevante Kontextinformation in Experiment 3 und das Verschwinden des Gedächtnisvorteils für perzeptuelle Details stereotypinkonsistenter Information im Falle expliziter Instruktion über den arbiträren Charakter der Kontextinformation in Experiment 4 sprechen eher für eine strategische Suche nach und Integration von relevanter Information zum Zwecke einer Rekategorisierung.

Diese Annahme wird vor allem durch das Phänomen des Nachlassens des Gedächtnisvorteils für perzeptuelle Details stereotypinkonsistenter Information im Verlauf der Eindrucksbildung gestützt. Dieser Effekt ist allerdings weniger ein Effekt des Nachlassens eines Inkonsistenz*vorteils,* sondern eher ein Nachlassen des Konsistenz*nachteils*. Dass sich das Gedächtnis für perzeptuelle Details konsistenter Information auf das Niveau der inkonsistenten Information verbessert, spricht für ein Nachlassen der Wirkung einer stereotypen Erwartung.

Zusammenfassend legen die Ergebnisse der vorliegenden Dissertation eher ein Modell eines strategischen Einsatzes resourcensparender Informationsverarbeitungsstrategien im Dienste einer realitätsadäquaten Informationsverarbeitung nahe, als die Annahme des Primats der Ressourcenersparnis.

Appendix

Selected itemlist (after Ehrenberg, Cataldegirmen & Klauer, 2001)

1. … stellt andere gern in der Öffentlichkeit bloß.
2. … lacht mit, wenn andere in Gegenwart von Ausländern rassistische Witze machen.
3. … läßt den Müll nach einer Party im öffentlichen Park einfach liegen.
4. … macht sich über die Sprachprobleme von Ausländern lustig.
5. … nimmt die Probleme anderer nie ernst.
6. … ist meist zu faul mit anzufassen, wenn ein Rollstuhlfahrer aus dem Bus aussteigen möchte.
7. … betrinkt sich oft auf Feten und wird dann aggressiv.
8. … setzt eher eine Freundschaft aufs Spiel, als in einem Streit um unwichtige Dinge nachzugeben.
9. … läßt andere nie aussprechen und hört selten genau zu.
10. … hat sich kaum um die schwerkranke Mutter gekümmert.
11. … macht oft Witze auf anderer Leute Kosten.
12. … nimmt sich keine Zeit für die Sorgen anderer, wenn es gerade ungelegen kommt.
13. … versucht selten, die Ansichten anderer nachzuvollziehen, auch wenn die selbst sehr tolerant sind.
14. … wird mit älteren Menschen schnell ungeduldig.
15. … hilft nicht, wenn ältere Leute am Bahnhof Schwierigkeiten mit ihrem Gepäck haben.
16. … ist es egal, ob sich jemand vom Rauchen gestört fühlt.
17. … ist häufig unehrlich zu anderen, wenn es bequemer scheint.
18. … wirft Altpapier in den Hausmüll, obwohl der nächste Altpapiercontainer nicht weit weg ist.
19. … erwartet immer sehr überschwenglichen Dank für einen Gefallen.
20. … hilft dem älteren Nachbarn nie bei der Gartenarbeit, obwohl der schon oft darum gebeten hat.
21. … drängelt sich in Warteschlangen oft einfach vor.
22. … hält es für unwichtig, an die Geburtstage von Freunden und Verwandten zu denken.
23. … paßt nur ungern auf die kleinen Kinder der Nachbarn auf, wenn die etwas Wichtiges zu erledigen haben.
24. … liegt nicht viel daran, mit anderen Leuten gut auszukommen.

25. … versucht nicht, im Winter sparsam zu heizen, weil die Abrechnung über eine Pauschale erfolgt.
26. … fühlt sich von Spendenaufrufen für Katastrophenhilfe nicht angesprochen.
27. … erreicht selbst gesetzte Ziele nur sehr selten.
28. … ist es völlig egal, ob der Hund auf öffentliche Rasenflächen macht.
29. … hat die Unterschriftenliste für mehr Spielplätze nicht unterschrieben.
30. … interessiert es nicht, daß auf dem Hausdach Solarzellen angebracht werden könnten.
31. … sieht es nicht ein, mehr Geld für fair gehandelten Kaffee auszugeben.
32. … setzt sich lieber vor den Fernseher, als ein gutes Buch zu lesen.
33. … überholt schon mal rechts auf der Autobahn, obwohl das ziemlich gefährlich ist.
34. … ist nicht ehrenamtlich tätig, weil es zu lästig ist, etwas für die Gemeinde zu tun.
35. … kann es nicht leiden, wenn Freundinnen und Freunde überraschend vorbeikommen.
36. … gibt gerne damit an, wenn etwas besonders gut gelungen ist.
37. … mag es nicht, wenn Besuch noch jemanden mitbringt.
38. … gibt Obdachlosen nie etwas, schließlich ist jeder selbst verantwortlich für sein Schicksal.
39. … verlangt von anderen oft mehr als von sich selbst.
40. … schmeichelt sich gerne bei wichtigen Leuten ein, auch wenn die unsympathisch sind.
41. … behält vertrauliche Sachen immer für sich.
42. … hält sich immer an Geschwindigkeitsbegrenzungen in Wohngebieten, allein der spielenden Kinder wegen.
43. … merkt, wenn andere sich nicht gut fühlen und geht einfühlsam darauf ein.
44. … hat Gebärdensprache gelernt, als ein Bekannter nach einem Unfall gehörlos wurde.
45. … setzt sich dafür ein, daß in der Stadt alle wichtigen Gebäude mit Rampen für Rollstuhlfahrer versehen werden.
46. … hat ein gutes Gespür dafür, wenn andere Menschen ein Problem haben.
47. … übernimmt in letzter Zeit die Treppenhausreinigung für die bettlägerige Nachbarin.
48. … formuliert Kritik an anderen immer so konstruktiv wie möglich.
49. … hat noch nie jemanden bei einer Verabredung einfach versetzt.
50. … spricht nie schlecht über andere hinter deren Rücken.
51. … geht nie über rote Ampeln, wenn Kinder in der Nähe sind.
52. … würde nie die Tatsachen verdrehen, auch wenn es Vorteile bringt.
53. … schickt öfter Hilfspakete mit Lebensmitteln und Kleidung in Krisenregionen.
54. … nimmt im Bus die Tasche vom Sitz neben sich auf den Schoß, damit andere Fahrgäste sich setzen können.

55. … hat eine gefundene Brieftasche mit 600 DM darin sofort abgegeben.
56. … nimmt die eigene Meinung nicht als Maß aller Dinge.
57. … achtet darauf, Waren mit möglichst wenig Verpackung zu kaufen.
58. … bietet älteren Leuten im Bus grundsätzlich den eigenen Sitzplatz an.
59. … kauft ausschließlich Getränke in Pfandflaschen.
60. … benutzt ausschließlich ökologische Reinigungsmittel.
61. … wirft Batterien und Medikamente grundsätzlich nicht in den Hausmüll.
62. … kauft nur Fleisch aus artgerechter Haltung, auch wenn das recht teuer ist.
63. … spendet Geld für die Rettung bedrohter Tierarten.
64. … hat schon öfter den Hund von Bekannten in Pflege genommen, wenn die im Urlaub waren.
65. … engagiert sich schon lange in der Jugendarbeit.
66. … kauft bevorzugt Lebensmittel aus ökologischem Anbau, auch wenn das recht teuer ist.
67. … wirft Zigarettenkippen selten einfach auf die Straße, auch wenn da ja gekehrt wird.
68. … kauft Weihnachtsgeschenke meist auf dem Basar der Behindertenwerkstatt, um diese zu unterstützen.
69. … spendet regelmäßig für Umweltschutzorganisationen.
70. … macht sich nicht hinter dem Rücken von anderen über sie lustig.
71. … unterhält sich gerne über anspruchsvolle Themen wie Kunst oder Literatur.
72. … käme nie auf die Idee schwarzzufahren.
73. … wendet sich nicht von Freunden ab, wenn diese Probleme haben.
74. … spricht Mißverständnisse offen an, damit sich nicht ein Problem daraus entwickelt.
75. … gelingt es leicht, gute Laune zu verbreiten.
76. … macht gerne anderen eine kleine Freude.
77. … bot einem wohnungssuchenden Freund übergangsweise die eigene Wohnung an.
78. … leiht einem guten Freund, der in Geldnot geraten ist, schon mal eine kleinere Summe.
79. … ist bei der Mülltrennung sehr konsequent.
80. … ist immer pünktlich, auch wenn das manchmal Warten zur Folge hat.
81. … trinkt morgens lieber Kaffee als Tee.
82. … ist nicht in Dresden zur Schule gegangen.
83. … gönnt sich zur Belohnung hie und da einen kleinen Luxus
84. … mag Zartbitterschokolade.
85. … ist mit 19 von zu Hause ausgezogen und nach Dresden gekommen.
86. … setzt sich bei schönem Wetter gerne abends an die Elbe.

87. … hat ihren letzten Urlaub an der Ostsee verbracht.
88. … vergisst manchmal, den Anrufbeantworter einzuschalten, wenn sie aus dem Haus geht.
89. … hat einen jüngeren Bruder, der in Leipzig wohnt.
90. … liest sich Verträge gut durch, bevor sie unterschreibt.
91. … geht gerne auf Flohmärkten auf Schnäppchenjagd.
92. … kocht nicht gerne für sich allein, sondern holt sich dann meist eine Pizza.
93. … geht im Sommer gerne ins Schwimmbad um die Ecke.
94. … hat sich jetzt eine gebrauchte Waschmaschine gekauft, weil der Waschsalon auf Dauer doch teuer ist.
95. … geht in der Woche abends gern mal ins Kino.
96. … überlegt schon länger, ob sie sich einen Computer anschaffen soll.
97. … kriegt im Sommer immer einen ziemlich schlimmen Heuschnupfen.
98. … hat sich im Laufe der Zeit eine große CD-Sammlung zugelegt.
99. … kauft sich ihre Zeitung meistens morgens am Kiosk.
100. … interessiert sich nicht für Horoskope oder Astrologie.
101. … hat sich als Kind für Modellflugzeuge begeistert.
102. … hätte schon gerne eine größere Wohnung, aber die Mieten sind so hoch.
103. … sammelt die Kinoposter von ihren Lieblingsfilmen.
104. … hat vor, über Ostern mit Freunden nach Frankreich zu fahren.
105. … guckt sich abends manchmal lieber einen Videofilm an statt zu lesen.
106. … unternimmt am Wochenende eigentlich immer etwas mit ihren Freunden.
107. … hat in ihrer Jugend viel Sport gemacht.
108. … holt sich Sonntags immer frische Brötchen von der Bäckerei unten im Haus.
109. … kann sich gut vorstellen, auch länger in Dresden wohnen zu bleiben.
110. … legt keinen großen Wert auf eine schicke Wohnungseinrichtung.
111. … leiht sich hin und wieder Videofilme aus der Stadtbücherei aus.
112. … schläft am Wochenende gerne lange aus.
113. … hat schon einmal ihren Schlüssel in der Wohnung liegengelassen und die Tür hinter sich zugezogen.
114. … geht gern am Wochende in Ruhe einkaufen.
115. … hat sich im letzten Jahr einen neuen Kühlschrank gekauft.
116. … hätte gern eine Wohnung mit Balkon.
117. … liest, wenn sie Zeit hat, lange die Tageszeitung.
118. … geht regelmäßig zu Vorsorgeuntersuchungen.

119. … trinkt gern frische Milch.

120. … geht einmal im Monat zum Frisör.

				Answer		
	Presentation			Prostitute	Physician	New
No load	Phase 1	Negative	Prostitute	65	14	12
			Physician	5	79	5
			New	9	5	514
		Positive	Prostitute	73	5	4
			Physician	8	72	12
			New	9	20	499
	Phase 2	Negative	Prostitute	65	10	12
			Physician	5	73	11
			New	9	5	514
		Positive	Prostitute	67	10	14
			Physician	12	64	8
			New	9	20	499
	Phase 3	Negative	Prostitute	63	8	15
			Physician	5	70	11
			New	9	5	514
		Positive	Prostitute	72	11	8
			Physician	6	72	10
			New	9	20	499
Load	Phase 1	Negative	Prostitute	41	15	25
			Physician	6	61	14
			New	15	7	474
		Positive	Prostitute	65	10	11
			Physician	14	38	29
			New	21	7	468
	Phase 2	Negative	Prostitute	57	13	16
			Physician	2	64	16
			New	15	7	474
		Positive	Prostitute	53	12	15
			Physician	16	54	17
			New	21	7	468
	Phase 3	Negative	Prostitute	45	18	18
			Physician	11	59	15
			New	15	7	474
		Positive	Prostitute	69	2	11
			Physician	7	61	12
			New	21	7	468

Table A 1: Segmented empirical answer frequencies in Experiment 1.

			Answer		
	Presentation		Prostitute	Physician	New
No Load	Negative	Prostitute	193	32	39
		Physician	15	222	27
		New	9	5	514
	Positive	Prostitute	212	26	26
		Physician	26	208	30
		New	9	20	499
Load	Negative	Prostitute	143	46	59
		Physician	19	184	45
		New	15	7	474
	Positive	Prostitute	187	24	37
		Physician	37	153	58
		New	21	7	468

Table A 2: Empirical answer frequencies in Experiment 1 (unsegmented data).

			Answer		
	Presentation		Left	Right	New
No load	Inconsistent	Left	281	77	74
		Right	103	242	87
		New	13	7	844
	Consistent	Left	275	79	78
		Right	91	243	98
		New	14	15	835
Load	Inconsistent	Left	245	81	90
		Right	83	228	105
		New	26	31	775
	Consistent	Left	235	88	93
		Right	93	230	93
		New	31	29	772

Table A 3: Empirical answer frequencies in Experiment 2 (unsegmented data).

				Answer		
	Presentation			Left	Right	New
No Load	Negative	Inconsistent	Left	137	38	41
			Right	42	126	48
			New	2	3	427
		Consistent	Left	147	41	28
			Right	46	129	41
			New	4	4	424
	Positive	Inconsistent	Left	144	39	33
			Right	61	116	39
			New	11	4	417
		Consistent	Left	128	38	50
			Right	45	114	57
			New	10	11	411
Load	Negative	Inconsistent	Left	100	38	30
			Right	35	89	44
			New	6	4	326
		Consistent	Left	138	53	57
			Right	53	139	56
			New	18	17	461
	Positive	Inconsistent	Left	145	43	60
			Right	48	139	61
			New	20	27	449
		Consistent	Left	97	35	36
			Right	40	91	37
			New	13	12	311

Table A 4: Empirical answer frequencies in Experiment 2 (unsegmented data).

				Answer		
	Presentation			Left	Right	New
No load	Negative	Inconsistent	Left	51	12	10
			Right	14	48	8
			New	2	3	427
		Consistent	Left	60	8	6
			Right	14	51	8
			New	4	4	424
	Positive	Inconsistent	Left	49	13	11
			Right	18	40	13
			New	11	4	417
		Consistent	Left	47	14	14
			Right	13	42	16
			New	10	11	411
Load	Negative	Inconsistent	Left	30	12	15
			Right	13	25	15
			New	6	4	326
		Consistent	Left	35	20	24
			Right	24	40	21
			New	18	17	461
	Positive	Inconsistent	Left	49	11	23
			Right	11	47	26
			New	20	27	449
		Consistent	Left	29	7	18
			Right	16	29	15
			New	13	12	311

Table A 5: Empirical answer frequencies in Experiment 2 Phase 1.

				Answer		
	Presentation			Left	Right	New
No load	Negative	Inconsistent	Left	40	14	17
			Right	19	31	20
			New	2	3	427
		Consistent	Left	43	18	10
			Right	19	38	16
			New	4	4	424
	Positive	Inconsistent	Left	41	14	12
			Right	25	38	13
			New	11	4	417
		Consistent	Left	35	13	23
			Right	17	34	20
			New	10	11	411
Load	Negative	Inconsistent	Left	35	14	8
			Right	10	37	12
			New	6	4	326
		Consistent	Left	57	16	17
			Right	15	44	17
			New	18	17	461
	Positive	Inconsistent	Left	46	18	18
			Right	19	38	21
			New	20	27	449
		Consistent	Left	34	14	9
			Right	14	24	15
			New	13	12	311

Table A 6: Empirical answer frequencies in Experiment 2 Phase 2.

				Answer		
	Presentation			Left	Right	New
No load	Negative	Inconsistent	Left	46	12	14
			Right	9	47	20
			New	2	3	427
		Consistent	Left	44	15	12
			Right	13	40	17
			New	4	4	424
	Positive	Inconsistent	Left	54	12	10
			Right	18	38	13
			New	11	4	417
		Consistent	Left	46	11	13
			Right	15	38	21
			New	10	11	411
Load	Negative	Inconsistent	Left	35	12	7
			Right	12	27	17
			New	6	4	326
		Consistent	Left	46	17	16
			Right	14	55	18
			New	18	17	461
	Positive	Inconsistent	Left	50	14	19
			Right	18	54	14
			New	20	27	449
		Consistent	Left	34	14	9
			Right	10	38	7
			New	13	12	311

Table A 7: Empirical answer frequencies in Experiment 2 Phase 3.

				Answer				
	Presentation			Prostitute		Physician		
				Left	Right	Left	Right	New
No Load	Positive	Prostitute	Left	49	28	5	2	18
			Right	26	80	1	9	18
		Physician	Left	10	3	69	22	30
			Right	5	8	28	62	28
			New	20	28	28	19	1385
	Negative	Prostitute	Left	64	30	15	6	21
			Right	28	76	8	5	17
		Physician	Left	2	3	66	20	10
			Right	0	3	24	57	16
			New	2	4	6	9	1459
Load	Positive	Prostitute	Left	33	13	3	0	19
			Right	26	66	5	4	35
		Physician	Left	8	12	56	21	39
			Right	5	14	24	27	66
			New	30	37	20	26	1247
	Negative	Prostitute	Left	24	33	15	7	57
			Right	17	59	14	9	37
		Physician	Left	1	2	37	10	18
			Right	1	2	20	31	14
			New	7	8	21	18	1306

Table A 8: Empirical answer frequencies in Experiment 3 Phase 1.

				Answer				
Presentation				Prostitute		Physician		
				Left	Right	Left	Right	New
No Load	Positive	Prostitute	Left	68	31	6	7	26
			Right	12	71	1	4	15
		Physician	Left	1	7	58	13	25
			Right	0	7	29	74	26
			New	20	28	28	19	1385
	Negative	Prostitute	Left	58	37	8	4	19
			Right	15	79	7	6	24
		Physician	Left	4	2	84	18	31
			Right	0	3	36	65	30
			New	2	4	6	9	1459
Load	Positive	Prostitute	Left	55	32	10	5	34
			Right	11	30	3	0	24
		Physician	Left	5	1	34	8	20
			Right	2	12	31	66	25
			New	30	37	20	26	1247
	Negative	Prostitute	Left	56	39	11	5	25
			Right	25	67	7	5	32
		Physician	Left	4	1	73	28	30
			Right	4	1	34	74	23
			New	7	8	21	18	1306

Table A 9: Empirical answer frequencies in Experiment 3 Phase 2

				Answer				
Presentation				Prostitute		Physician		
				Left	Right	Left	Right	New
No Load	Positive	Prostitute	Left	68	32	8	2	20
			Right	27	77	4	4	21
		Physician	Left	3	1	76	25	27
			Right	3	7	18	63	12
			New	20	28	28	19	1385
	Negative	Prostitute	Left	60	20	5	2	21
			Right	17	58	6	4	20
		Physician	Left	3	4	80	20	23
			Right	1	4	33	71	27
			New	2	4	6	9	1459
Load	Positive	Prostitute	Left	69	36	8	2	21
			Right	17	82	4	5	28
		Physician	Left	10	14	65	22	25
			Right	1	6	19	30	12
			New	30	37	20	26	1247
	Negative	Prostitute	Left	27	17	9	3	12
			Right	12	31	4	9	12
		Physician	Left	2	1	71	30	32
			Right	2	1	31	66	36
			New	7	8	21	18	1306

Table A 10: Empirical answer frequencies in Experiment 3 Phase 3

				Answer				
Presentation				Prostitute		Physician		
				Left	Right	Left	Right	New
No Load	Positive	Prostitute	Left	185	91	19	11	64
			Right	65	228	6	17	54
		Physician	Left	14	11	203	60	82
			Right	8	22	75	199	66
			New	20	28	28	19	1385
	Negative	Prostitute	Left	182	87	28	12	61
			Right	60	213	21	15	61
		Physician	Left	9	9	230	58	64
			Right	1	10	93	193	73
			New	2	4	6	9	1459
Load	Positive	Prostitute	Left	157	81	21	7	74
			Right	54	178	12	9	87
		Physician	Left	23	27	155	51	84
			Right	8	32	74	123	103
			New	30	37	20	26	1247
	Negative	Prostitute	Left	107	89	35	15	94
			Right	54	157	25	23	81
		Physician	Left	7	4	181	68	80
			Right	7	4	85	171	73
			New	7	8	21	18	1306

Table A 11: Empirical answer frequencies in Experiment 3 (unsegmented data).

			Answer		
	Presentation		Left	Right	New
Prostitute	Negative	Left	13	11	21
		Right	7	19	19
		New	1	12	257
	Positive	Left	23	9	13
		Right	17	15	13
		New	11	7	252
Physician	Negative	Left	29	11	8
		Right	9	28	11
		New	5	5	278
	Positive	Left	26	9	13
		Right	5	19	24
		New	11	9	268
	Consistent	Left	39	20	34
		Right	12	38	43
		New	12	21	525
	Inconsistent	Left	52	20	21
		Right	26	43	24
		New	16	12	530

Table A 12: Empirical answer frequencies in Experiment 4, Condition 1 (Phase 1).

			Answer		
	Presentation		Left	Right	New
Prostitute	Negative	Left	27	10	8
		Right	7	28	10
		New	1	12	257
	Positive	Left	21	8	16
		Right	12	18	15
		New	11	7	252
Physician	Negative	Left	28	10	10
		Right	8	31	9
		New	5	5	278
	Positive	Left	25	10	13
		Right	9	31	8
		New	11	9	268
	Consistent	Left	52	20	21
		Right	16	59	18
		New	12	21	525
	Inconsistent	Left	49	18	26
		Right	20	49	24
		New	16	12	530

Table A 13: Empirical answer frequencies in Experiment 4, Condition 1 (Phase 2).

			Answer		
	Presentation		Left	Right	New
Prostitute	Negative	Left	26	14	5
		Right	7	31	7
		New	1	12	257
	Positive	Left	30	9	6
		Right	9	25	11
		New	11	7	252
Physician	Negative	Left	30	8	10
		Right	10	24	14
		New	5	5	278
	Positive	Left	30	9	9
		Right	8	28	12
		New	11	9	268
	Consistent	Left	56	23	14
		Right	15	59	19
		New	12	21	525
	Inconsistent	Left	60	17	16
		Right	19	49	25
		New	16	12	530

Table A 14: Empirical answer frequencies in Experiment 4, Condition 1 (Phase 3).

			Answer		
	Presentation		Left	Right	New
Prostitute	Negative	Left	66	35	34
		Right	21	78	36
		New	1	12	257
	Positive	Left	74	26	35
		Right	38	58	39
		New	11	7	252
Physician	Negative	Left	87	29	28
		Right	27	83	34
		New	5	5	278
	Positive	Left	81	28	35
		Right	22	78	44
		New	11	9	268
	consistent	Left	147	63	69
		Right	43	156	80
		New	12	21	525
	inconsistent	Left	161	55	63
		Right	65	141	73
		New	16	12	530

Table A 15: Empirical answer frequencies in Experiment 4, Condition 1 (unsegmented data).

			Answer		
Presentation			Left	Right	New
Prostitute	Negative	Left	25	14	6
		Right	11	27	7
		New	7	10	253
	Positive	Left	27	7	11
		Right	14	21	10
		New	9	5	256
Physician	Negative	Left	29	14	2
		Right	16	21	8
		New	5	6	259
	Positive	Left	26	11	8
		Right	11	28	6
		New	13	8	249
	Consistent	Left	51	25	14
		Right	22	55	13
		New	20	18	502
	Inconsistent	Left	56	21	13
		Right	30	42	18
		New	14	11	515

Table A 16: Empirical answer frequencies in Experiment 4, Condition 2 (Phase 1).

			Answer		
Presentation			Left	Right	New
Prostitute	Negative	Left	26	10	9
		Right	12	24	9
		New	7	10	253
	Positive	Left	23	15	7
		Right	13	25	7
		New	9	5	256
Physician	Negative	Left	26	6	13
		Right	8	22	15
		New	5	6	259
	Positive	Left	26	7	12
		Right	10	26	9
		New	13	8	249
	Consistent	Left	52	17	21
		Right	22	50	18
		New	20	18	502
	Inconsistent	Left	49	21	20
		Right	21	47	22
		New	14	11	515

Table A 17: Empirical answer frequencies in Experiment 4, Condition 2 (Phase 2).

Presentation			Answer: Left	Right	New
Prostitute	Negative	Left	25	11	9
		Right	9	25	11
		New	7	10	253
	Positive	Left	26	6	13
		Right	11	21	13
		New	9	5	256
Physician	Negative	Left	22	13	10
		Right	15	22	8
		New	5	6	259
	Positive	Left	25	9	11
		Right	15	24	6
		New	13	8	249
	Consistent	Left	50	20	20
		Right	24	49	17
		New	20	18	502
	Inconsistent	Left	48	19	23
		Right	26	43	21
		New	14	11	515

Table A 18: Empirical answer frequencies in Experiment 4, Condition 2 (Phase 3).

			Answer: Left	Right	New
Prostitute	Negative	Left	76	35	24
		Right	32	76	27
		New	7	10	253
	Positive	Left	76	28	31
		Right	38	67	30
		New	9	5	256
Physician	Negative	Left	77	33	25
		Right	39	65	31
		New	5	6	259
	Positive	Left	77	27	31
		Right	36	78	21
		New	13	8	249
	Consistent	Left	153	62	55
		Right	68	154	48
		New	20	18	502
	Inconsistent	Left	153	61	56
		Right	77	132	61
		New	14	11	515

Table A 19: Empirical answer frequencies in Experiment 4, Condition 2 (unsegmented data).

Ehrenwörtliche Erklärung

Ich erkläre hiermit, dass mir die Promotionsordnung der Fakultät für Sozial- und Verhaltenswissenschaften bekannt ist.

Ferner erkläre ich, dass ich die vorliegende Arbeit selbst und ohne unzulässige Hilfe Dritter angefertigt habe. Alle von mir benutzten Hilfsmittel, persönlichen Mitteilungen und Quellen sind in der Arbeit angegeben. Bei der Auswahl und Auswertung des folgenden Materials haben mir die nachstehend aufgeführten Personen in der beschriebenen Weise geholfen:

Stefanie Ganz, Carina Giesen, Rebecca Kosan, Beatrix Mauder, Claudia Pohl, Sebastian Pohlack und Kerstin Weißer haben als studentische Hilfskräfte der Nachwuchsgruppe "Mentale Repräsentation sozialer Kategorien" bei der Durchführung der Experimente sowie der Eingabe der Daten geholfen.

Weitere Personen waren an der inhaltlich-materiellen Erstellung der Arbeit nicht beteiligt. Insbesondere habe ich hierfür nicht die Hilfe eines Promotionsberaters in Anspruch genommen und Dritte haben weder unmittelbar noch mittelbar geldwerte Leistungen von mir für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen.

Die Arbeit wurde weder im In- noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt. Weder früher noch gegenwärtig habe ich an einer anderen Hochschule eine Dissertation eingereicht.

Ich versichere, dass ich nach bestem Wissen die reine Wahrheit gesagt und nichts verschwiegen habe.

Ort, Datum Unterschrift