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The relationship between implicit and explicit motives, goal pursuit, and autobiographical memory content during a diary study

Michael Bender¹, Barbara A. Woike², Christopher T. Burke³, and Emily A. A. Dow⁴

¹Tilburg University, the Netherlands ²Columbia University, Barnard College, NY, USA ³Lehigh University, Bethlehem, PA, USA ⁴The Graduate Center, City University of New York, NY, USA

Abstract

This online diary study investigated how motives interact with goal pursuit to predict daily autobiographical experiences. Participants ($N=141$) completed measures of implicit and explicit achievement, provided daily memories and reports of their goal pursuit during a three-week diary period. A stronger implicit achievement motive at the onset of the study was associated with more agentic (and fewer communal) autobiographical content. Goal progress was linked with using more agentic words, while goal attainability was related to using more communal words. Interactions between motives and goal pursuit on autobiographical memory suggests a trade-off: Favorable goal pursuit conditions may prompt people not motivated for achievement to shift their focus from agentic to communal themes, while individuals motivated for achievement maintain their priorities.

Keywords

autobiographical memory; implicit motives; explicit motives; motive congruence; diary study; goal characteristics; LIWC

1. Introduction

In the past, several studies have investigated how people's needs and desires, and the manner in which they pursue their goals, result in pathways towards well-being (see e.g., Brunstein, 1993; Brunstein, Schultheiss, Graessmann, 1998). More recent studies have focused on the importance of motivational processes for everyday cognitive processes and in particular one's autobiographical memory (see Bender & Woike, 2010; Woike, 2008 for overviews), which is considered one of the constitutional elements of a person's identity (Bluck, 2003, Pillemer, 1998). But how are the concerns and challenges that an individual experiences when pursuing a goal reflected in the daily recollection of their autobiographical memories? It has been argued that it is necessary to consider situational information (like the

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Correspondence concerning this article should be addressed to Michael Bender, School of Social and Behavioural Sciences, Tilburg University, P. O. Box 90153, Tilburg 5000 LE, The Netherlands. Phone: (+31)13 466 8707., M.Bender@uvt.nl or Barbara Woike, Department of Psychology, Barnard College, 3009 Broadway, New York, NY 10027., bw81@columbia.edu.

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specifics of goal pursuit) in order to understand the role of motives in people's lives (Schultheiss, 2008; Schultheiss, Kordik, Kullmann, Rawolle, & Rösch, 2009; Woike, 2008). An inspection of the intersection of personological and situational factors has also proven fruitful for the investigation of memory processes (Woike, Bender, & Besner, 2009). We therefore propose that the types of memories individuals recall may not only depend on their motivational disposition, but also on the situational characteristics of their goal pursuit. For example, in study-related stress periods, achievement topics might be more prevalent in an achievement-motivated student's recollection of his or her life compared to a student not motivated by achievement. However, little is known yet about the motivational and goal-related antecedents of such recollections, a gap which we set out to investigate in the present longitudinal diary study. In the following sections, we summarize the existing literature on the relationship between implicit and explicit motives, goal characteristics, and autobiographical memory.

Implicit motivational processes have been traditionally described as operating outside of conscious awareness (McClelland, Koestner, & Weinberger, 1989; Schultheiss, 2008). Self-attributed, or explicit, motives, on the other hand, are studied via self-report questionnaires and have been theorized to be particularly related to the self-concept and social categories. Studies that have demonstrated the validity for discriminating between these motive dispositions also found that they develop at ontogenetically different stages and are associated with different types of behaviors (McClelland & Pilon, 1983; for an overview, see Schultheiss, 2008; Woike, 2008). The two motive systems are not strongly correlated (Schultheiss & Pang, 2007), but their interaction can have important consequences: An alignment, or congruence between the two systems (e.g., being implicitly and explicitly motivated for achievement) is beneficial for a person's well-being, since such an individual is striving on both conscious and unconscious levels towards the same kind of goals (Baumann, Kaschel & Kuhl, 2005; Brunstein & Maier, 2005; Hofer & Chasiotis, 2003; Hofer, Chasiotis & Campos, 2006). If, however, an individual's implicit motivational disposition is at odds with consciously desired, explicit goals, this tension is experienced as emotional distress (Pueschel, Schulte, & Michalak, 2011).

Motives have been shown to be of particular importance for how individuals deal with the challenges of daily goal pursuit (Palys & Little, 1983), and numerous researchers have advocated that pursuing personally meaningful goals is one of the essential ingredients in building and maintaining satisfaction with life (see Brunstein, 1993; Emmons, 1986; Little, 1989). One study, for example, found that a person's motivational disposition is a crucial determinant of pathways towards emotional well-being (Brunstein et al., 1998): While progress towards goals that are motive-congruent (i.e., whose content is related to one's dominant motive orientation) is experienced as personally satisfying, progress towards goals that are not aligned with a person's predominant motive disposition is not experienced as satisfying. A general conclusion of this study is that progress towards goals that are highly related to a person's motivational disposition (i.e., an important achievement goal for a highly achievement-oriented person) should contribute to the satisfaction of motivational needs and thereby the experience of enhanced emotional well-being (Brunstein et al., 1998). Favorable constellations that facilitate goal attainment can act as necessary preconditions for higher levels of well-being, signifying the importance of situational goal characteristics (Brunstein, 1993).

People's concerns are often reflected in their personal autobiographical narratives. Understanding these memories has long been considered a gateway to understanding what motivates people (Woike, 2008). Both implicit and explicit motivational processes have been put forward as organizing mechanisms of personally relevant autobiographical memories. In particular, implicit motives seem to facilitate the recollection of

autobiographical experiences, especially when the content is related to the motive in question. When asked to report personally meaningful life experiences, persons with a strong implicit need for achievement or power more often recall events concerned with dominance, mastery, and achievement. Individuals that show a strong implicit need for intimacy, however, are more likely to think of experiences revolving around friendship, love and communal themes (McAdams, 1982, 1985; McAdams, Hoffman, Mansfield, & Day, 1996; Woike, 1994a; Woike, Gershkovich, Piorkowski, & Polo, 1999; Woike, Mcleod, & Goggin, 2003). Previous research has found that the themes and concerns revealed in memories are closely related to the individual's implicit motivational dispositions in both diary studies (Woike, 1995; Woike & Polo, 2001) and in standardized recall and recognition tasks (Woike, Lavezzary, & Barsky, 2001). The same pattern was recently demonstrated experimentally in a person x situation framework (Woike, 2008; Woike et al., 2009). Individuals who have just re-experienced a success recall more achievement-related words (but not other words) in a free recall task the more they are motivated for implicit achievement – clear evidence for the importance of situational factors for the interplay between motives and memories (Woike et al., 2009).

While implicit motives may often be related to specific autobiographical events that are rich in detail, explicit motives are more likely to be associated with general, self-descriptive autobiographical memories. For example, DeSteno and Salovey (1997) observed that people who were asked to come up with self-descriptions oftentimes chose descriptions that were congruent with their explicit motivational needs. Implicit and explicit motivational processes thus seem differentially related to the recall of personally relevant information: While implicit motives have been shown to be related particularly to affective memorable experiences, explicit motives seem to be related to routine memories – a pattern that was supported experimentally when priming implicit and explicit motives with a vivid recollection task or open-ended self-descriptions, respectively (Woike, 1995). Woike and colleagues (2003) found that implicit motives act as facilitators for the recall of specific, emotional events, while explicit motives are predictive of routine, self-descriptive events.

Implicit and explicit motives also influence how individuals formulate everyday goals (see Emmons, 1986, 1989), and they have been shown to interact with the specific circumstances of goal pursuit (see Brunstein et al., 1998). Similarly, the manner in which individuals recall their lives is shaped by their implicit and explicit motivational need system (see Woike, 2008). Autobiographical stories in general, but personally relevant memories in particular, may serve as important outlets for daily concerns, emotions, and recurrent themes (Bluck, 2003). We assume that with limited cognitive resources it is natural that individuals do not express concerns about a wide variety of topics, but instead choose the concerns that are central to them. In that selective process, we suggest that motivational needs and the situational characteristics of individual goal pursuit act as organizing principles that guide people's autobiographical recall. In other words, do individuals recall different personal memories at the end of their day depending on whether they have made great strides forward in reaching their goals? Would the affective tone of such memories be different from memories on days when little progress was made? And, most importantly, can a person's motivational disposition help us understand such differences?

The objective of the present study was to address these questions in the context of real-world goal pursuit. More specifically, we tracked a sample of college students as they pursued an active achievement goal of their own nomination. We focused on the implicit need for achievement, the recurrent concern with mastery and attaining standards of excellence (McClelland, Atkinson, Clark, & Lowell, 1953) and the explicit self-attributed need for achievement, which is concerned with performance in well-structured task situations (McClelland, et al., 1989). The study has a daily diary design, which provides access to rich,

open-ended accounts of daily experiences, including goal pursuit and autobiographical memories. In the following sections, we summarize our predictions for two characteristics of autobiographical recollections displayed in the participants' daily memory reports: *memory content* and *affective tone*. Given the dearth of previous longitudinal studies examining the links between explicit and implicit motives, goal pursuit, and autobiographical memories, we specified expected patterns of results rather than a set of specific hypotheses to be tested.

We first turn to the *content* of autobiographical memories. We assume that a person's implicit and explicit motivational disposition towards achievement and the characteristics of goal pursuit (e.g., attainability or daily progress) predict what participants recall in their daily diary entries. One expectation is that individuals high in implicit and explicit achievement will be more concerned with achievement-related, agentic topics in their daily autobiographical memories (Hypothesis 1a). At the same time, such individuals should less often recall communal content in their memories (Hypothesis 1b). The context of goal pursuit (signified by the goal characteristics on a given day) is also assumed to shape the daily recollections of participants: When people make progress towards their achievement goals (Hypothesis 2a) or experience their goal as more attainable (Hypothesis 2b), we expected them to also recall daily memories that are richer in agentic content. At the same time, we expected that progress toward their achievement goal (Hypothesis 3a) and experiencing their goal to be attainable (Hypothesis 3b) would be associated with fewer communal words in people's daily recollections. In other words, the nature of an individual's daily activities will be reflected in the type of memories participants recall in their diary entries: We predicted more agentic words and fewer communal words when conditions of achievement goal pursuit are favorable. Given the absence of previous longitudinal studies on the joint influence of implicit and explicit motives and goal characteristics on autobiographical memories, we refrained from making too specific predictions with regard to possible interaction effects between these variables. However, drawing on the increasing literature on the effects of implicit and explicit motive congruence, we had one specific hypothesis: Favorable conditions of goal pursuit should be linked to the use of agentic words in people's diary entries more strongly for those higher in achievement motives, especially for those who exhibit motive congruence with high levels of both the implicit and explicit achievement motive (Hypothesis 4).

Next, we specify our expectations with regard to the *affective tone* of the autobiographical diary entries. First, we expected that favorable goal conditions would be connected to a more positive affective tone of diary entries, since hedonic rewards can be considered a building block of motives and goal pursuit (Woike, 2008). To be precise, we expected that goal progress (Hypothesis 5a) and goal attainability (Hypothesis 5b) would lead to an increase in positive emotion words in people's daily autobiographical memories. Corresponding with this prediction, we proposed that goal progress (Hypothesis 6a) and attainability (Hypothesis 6b) would be accompanied by a decrease in negative emotion words in autobiographical diary entries. But would such experiences be different for more or less achievement-motivated individuals? At this point, with little prior research, it is not yet clear which possibility is most likely. For instance, it is plausible that highly motivated individuals would reap more emotional benefits from favorable goal pursuit conditions (Hypothesis 7a). Alternatively, those who are insufficiently motivated for their goal may depend more on the temporary affective 'relief' of favorable conditions (Hypothesis 7b). Because other patterns are also possible, we refrained from making a strong prediction for the interaction between motives and goal conditions.

2. Method

2.1. Sample

A total of 175 undergraduate students participated in this daily diary study as partial completion of their course requirements for introductory psychology. We focused on a college student sample to ensure the salience of the achievement motive. Fourteen participants were excluded because they did not complete the measure of implicit motives. We also restricted our analysis to those completing at least seven days of diary questionnaires (cf. Gleason, Iida, Shrout, & Bolger, 2008), resulting in a final sample of 141. Of the 24 participants excluded for insufficient days of data, 13 completed no diary questionnaires at all. Although this sample size amounts to a loss of approximately 20% of the total number of participants, this proportion may inaccurately reflect the loss of data. Looking instead at the proportion of total diary days included in the final analysis, we are utilizing 2,030 of 2,096 observations, or nearly 97%. The average age of participants was 19.7 years ($SD = 0.4$). The sample was 94% female and consisted ethnically of approximately 64% White, 14.5% Asian, 8.5%, Hispanic/Latino, 3% Black or African American, and 10% mixed, other or unspecified ethnicities.

2.2. Procedure

Data collection for this longitudinal study took place during the Fall semester of 2007, the Spring semester of 2008, and the Fall semester of 2008 at Barnard College, NY, NY, USA. In an initial survey, the motivational disposition and other baseline variables were assessed. Starting on the next day, participants began completing an online diary questionnaire once daily for three weeks. Some participants continued completing the questionnaire beyond the requested three-week window, and the data reported here include all data provided by participants. On average, participants completed 11.1 daily questionnaires ($SD = 6.9$), with a range of 1–31 days. As stated above, participants with fewer than seven days of data were excluded from analysis. Upon completion of the diary period, participants completed a final survey, which reassessed implicit and explicit motives and other variables included in the initial survey. All measures were collected online via the SurveyMonkey.com website. Previous experiences with electronic versions of the employed (or similar) measures indicated no difficulties with this medium for student samples (see for example Woike et al., 2009).

2.3. Measures

2.3.1. Implicit achievement motive—Students filled out a version of the Picture Story Exercise (PSE, see Schultheiss & Pang, 2007), which is based on the Thematic Apperception Test (TAT, Murray, 1943), to assess their implicit need for achievement. In this exercise, people are instructed to create stories in response to ambiguous picture stimuli. Altogether six picture stimuli were selected that have proven useful in previous assessments of implicit achievement (Woike, 1994a, 1994b, 1995; Woike et al., 2009). These pictures included two people sitting on a bench, a man working at a desk, a ship captain and another man, two women working in a laboratory, male and female trapeze performers, and a man and a woman in a field with horses and a dog (see Smith, 1992, pp. 633–638 for reproductions). The range of scores for initial implicit achievement was 0–15 ($M = 4.85$; $SD = 3.73$), and for final implicit achievement the range was 0–13.5 ($M = 4.66$; $SD = 3.47$). In keeping with the standard procedure for coding implicit motive content (Pang, 2010), two undergraduate research assistants received training with a manual for coding implicit achievement motive content (McClelland, Atkinson et al., 1953). After achieving a 90% agreement with the training material, both coders scored the same 15% of all PSE stories independently, which revealed an inter-rater agreement of .85. The remaining stories were then split evenly between the coders.

2.3.2. Explicit achievement motive—Participants' self-attributed need for achievement was assessed in the initial session with the achievement subscale of the Personality Research Form (PRF; Jackson, 1989). This subscale consists of 16 items like "I often set goals that are very difficult to reach." Participants were prompted to label these items either as "true" or "false", meaning that the possible range of sum scores is 0 to 16. The observed range of scores on the initial survey was 3–16 with a mean of 10.99 ($SD = 3.04$). On the final survey, the range was 1–16 with a mean of 10.69 ($SD = 3.18$). This scale showed modest internal consistency, with a Cronbach's alpha of .67 for the initial survey and .70 for the final survey.

2.3.3. Personal goals—In the initial session, students were asked to indicate a goal that reflects their striving for achievement or mastery experiences. In order to be able to verify the goal content, they were instructed to describe their goal in a way that others would understand it. To be unambiguous, they were given an example ("I am very athletic and would like to win the next competitions. I am training very hard to break my own record."). During the diary period, participants were asked to reflect on their pursuit of their goal.

2.3.4. Daily goal progress—Daily progress towards the goal was measured by four items adapted from Brunstein et al. (1998). Participants rated their agreement with items such as, "I have made a great deal of progress in the attempt of advancing this goal." on a five-point Likert scale ranging from 0 "Strongly disagree" to 4 "Strongly agree". These items were averaged to form a composite score of daily progress ($M = 2.42$, within-person $SD = 0.50$, between-person $SD = 0.75$). Ignoring the multilevel nature of the data yielded an estimated reliability of .87. Averaging across days for each person yielded a reliability estimate of .95.

2.3.5. Daily goal attainability—Perceived attainability of participants' goals was assessed daily with six items adapted from Brunstein et al. (1998). Participants rated their agreement with items such as, "I can manage my life situation in such a way that it promotes the accomplishment of this goal." on a five-point Likert scale ranging from 0 "Strongly disagree" to 4 "Strongly agree". We averaged these items to create an index of daily goal attainability ($M = 2.61$, within-person $SD = 0.34$, between-person $SD = 0.57$). Looking at all observations together resulted in an estimated reliability of .77, and averaging across days for each person yielded a between-persons reliability estimate of .83.

2.3.6. Daily open-ended memory task—As described in the introduction, the themes and content of autobiographical memories can provide a window into an individual's most important concerns (Ross & Wilson, 2000; Singer & Salovey, 1993). Rather than ask participants to self-report on their experiences via multiple-choice questions (which might introduce response biases), we provided an opportunity for participants to freely express memories of importance and personal involvement each day using an open-ended response format. Such a response format, which resembles writing a journal entry, has been shown to be more ecologically salient and less obtrusive (Litt, Cooney, & Morse, 1998). Although participants might have been aware that we were interested in their memories, they could not have known how the memories would be analyzed, and could therefore not have adjusted their response patterns accordingly. If personal goals are important for peoples' lives, then their content and impact should filtrate through everyday experiences. Participants were given the following instructions:

Take a few minutes to think about the things that came to your mind today. We are interested in the personal memory that you thought of the most today, or that "popped up" in your mind the most. This can be a memory from the distant past as well as a very recent memory. This memory need not be important or interesting to

others. There are no right or wrong descriptions. Your memories may or may not be linked to your goals. In your description of the experience, you might want to include the setting or location, who else was there, and what happened so that the event is described in a way that others will understand. Please remember to do this task at the end of the day, before you go to bed. This task should not take longer than 5–10 minutes.

2.3.7. Coding of memories—We used the Linguistic Inquiry and Word Count (LIWC) program to identify patterns of word usage in the participants' daily memories. LIWC is a text analysis software program designed by Pennebaker, Booth, and Francis (2007, see also Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). LIWC compares each word of a text excerpt with the existing categories of a programmed dictionary, and adjusts the frequency count when it matches one of these categories (for methodological details on the most recent version of the program, see Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). There are more than 80 categories that can be investigated in the LIWC dictionaries. We selected those categories that relate to agentic (work, achieve) or communal (social) issues, to keep in line with the general motivational distinction by Bakan (1966). In addition, we chose to investigate the affective character of the daily memories by selecting positive and negative emotions as additional categories. Detection of emotions with LIWC has been shown to be accurate (Kahn, Tobin, Massey, & Anderson, 2007) and corresponds to human coder ratings (Alpers, Winzelberg, Classen, Roberts, & Koopman, 2005).

2.4. Overview of Statistical Procedures

The daily diary nature of the present study is one of its greatest strengths, creating the possibility to examine the interplay of motives, goal pursuit, and autobiographical memory processes at both the between- and within-person levels (Bolger, Davis, & Rafaeli, 2003). More specifically, we were interested in how day-to-day changes in goal pursuit relate to the content of autobiographical memory (a within-person process), and how these associations vary as a function of individual differences in implicit and explicit motives (a between-person process). However, given that most conventional statistical analyses such as ANOVA and regression require observations to be conditionally independent, diary data poses a data analytic challenge. In studies with a small number of repeated observations, repeated measures ANOVA can efficiently account for the dependence of within-subject observations, but repeated measures ANOVA quickly becomes unwieldy in diary studies that involve several weeks of daily observations. In addition, the repeated measures ANOVA analysis tends to treat each observation as a distinct event, rather than assuming a continuous process that evolves across the diary period.

As an alternative, diary researchers typically turn to a mixed model analysis, also known as hierarchical linear modeling or multilevel modeling (Raudenbush & Bryk, 2002). The mixed model, which can be thought of as a generalization of regression analysis, allows the parameters of a regression model to vary randomly across individuals in the population. The result is an estimate of the average value of a given parameter in the population (known as a *fixed effect*), as well as an estimate of the between-person variability in the parameter that is unaccounted for by the predictors in the model (known as a *random effect*). In the present study, our focus is on the fixed effects, given our goal to describe a general process by which motives interact with daily goal pursuit to predict the content of autobiographical memory.

The outcome variables in these analyses were the word count variables from the LIWC analysis of the daily memories. These variables represent frequencies of relatively rare events, a situation amenable to Poisson regression (Cohen, Cohen, West, & Aiken, 2003). A

primary concern in Poisson analysis is that the data are properly dispersed, as overdispersion can lead to an increase in type-I errors if unaddressed. Assuming a negative binomial response process rather than a Poisson can account for overdispersion, leading to more accurate results (Cohen et al., 2003). Preliminary analyses revealed marked overdispersion in the LIWC variables, so we implemented these analyses in the GLIMMIX procedure of SAS (SAS Institute Inc., 2010) with a negative binomial distribution and log link function.

In the analyses reported below, implicit and explicit achievement motive scores were centered on their respective grand means before being entered into the analysis. In addition, we included the interaction of implicit and explicit motives to allow us to examine the implications of motive congruence (Hofer et al., 2006). Wherever this interaction was significant (or marginal), we followed up with tests of the simple slopes to more clearly describe the nature of the interaction. We used a person-centered approach to enter the daily progress and attainability variables as predictors. To do so, we separated each person's average on each variable from his or her daily deviation from that average. Both components were then entered into the analysis and allowed to interact with the motive variables. This procedure allowed us to examine both between- and within-person associations between goal progress and attainability and the outcomes of interest (Enders & Tofighi, 2007). That is, we could distinguish between the correlates of day-to-day variation in the goal pursuit variables (e.g., experiencing a higher than usual amount of progress on a given day) from between-person differences in the same variables (e.g., individuals who reported greater progress than others in general). Finally, in all analyses we adjusted for the word count of each memory (as opposed to the average word count across all memories for a given individual) to account for the fact that words of any variety will be more likely to occur in longer memory descriptions.¹

Pulling all of these details together, the following equation represents a prototype for the analyses we report below:

$$\ln(L_{it}) = b_{0i} + b_1 W_{C_{it}} + b_2 I_{C_i} + b_3 E_{C_i} + b_3 I_{C_i} E_{C_i} + \bar{P}_{C_i} [b_5 + b_6 I_{C_i} + b_7 E_{C_i} + b_8 I_{C_i} E_{C_i}] + dP_{it} [b_9 + b_{10} I_{C_i} + b_{11} E_{C_i} + b_{12} I_{C_i} E_{C_i}] + \varepsilon_{it}$$

Here, L_{it} represents the value of the focal LIWC variable for person i on day t of the diary period. $W_{C_{it}}$ is the word count for the memory on which the outcome is based for person i and day t ; it is centered at its grand mean. I_{C_i} and E_{C_i} represent person i 's centered values of implicit and explicit achievement motives, respectively. $\bar{P}_{C_i}$ is person i 's average level of achievement goal progress across the diary period (centered on its grand mean), and dP_{it} is his deviation from that average on day t . The b s are multilevel regression coefficients, and the i subscript on b_0 indicates that individuals are allowed to vary in their baseline level of the outcome variable. Under both the Poisson and negative binomial models, the natural logarithm of the outcome variable for person i on day t is a linear combination of the set of predictors plus ε_{it} , a within-person residual.²

¹In addition to the word counts for the daily memories, we considered adjusting for the word counts from participants' PSE responses. However, we found that the PSE word counts were uncorrelated with the implicit achievement motives ($r = .01$, $p = .870$), and that including PSE word counts did not meaningfully change any of the results. Thus, we have not included PSE word counts in the analyses presented here.

²Multilevel Poisson and negative binomial models do not allow for effect size estimation. Indicators such as R^2 or standardized coefficients in typical regressions only apply to models that can be estimated by ordinary least squares, and the models presented here do not fit this criterion (they must be estimated by maximum likelihood). For example, Hofer and colleagues (2006) present standardized coefficients, which are based on standardized versions of the outcome and predictor variables, as a way of capturing the magnitude of motive congruence effects. However, because Poisson and negative binomial models are used for modeling count data, standardizing the outcome variable would create negative values that would prevent the analysis from running. Therefore, estimates of effect size do not accompany the results presented below, and we acknowledge that this limits the interpretability of the results somewhat.

3. Results

3.1 Zero-order correlations

Table 1 provides means and standard deviations for each of the study variables, as well as all zero-order correlations. Note that the means included in the table are the raw means of the variables, rather than the centered versions that are included in the analyses. The correlations in Table 1 were computed on the between-person means of the daily variables (memory word count, goal progress, goal attainability, and LIWC variables) and therefore reflect how individuals differ in their written memories and goal pursuit. Two points are worth noting. First, looking at the correlates of word count, individuals who elaborated more in their daily memories tended to have a stronger explicit achievement motive and use somewhat fewer agentic words. Interestingly, the explicit, but not the implicit, achievement motive is moderately positively correlated with daily goal progress and attainability. In contrast, the implicit, but not the explicit, achievement motive is related to the LIWC categories of agency and communion. These correlations suggest that both motive systems relate to participants' experiences over the course of the diary study, but in different ways.

3.1. Do motives and goal characteristics predict the content of daily memories?

To address this question, we first examined whether implicit and explicit motives were related to the use of agentic and communal words (indicated by the combined LIWC categories “work” and “achieve”, and “social”, respectively). We then ran separate analyses with progress and attainability as the daily goal pursuit variables, based on the prototype in equation (1). This section is concluded with an exploration of the interaction effects between implicit and explicit motives and goal pursuit characteristics.

In support of Hypothesis 1a, we found a significant main effect of the implicit achievement motive ($t(125) = 2.45, p = .016$), indicating that those with a stronger implicit achievement motive used more agentic words in their daily memories. In relation to Hypothesis 1b, there was a strong suggestion that the implicit achievement motive predicted use of fewer communal words: The main effect of implicit motives was significant in the attainability model ($t(125) = -2.10, p = .038$) and marginal in the progress model, $t(125) = -1.89, p = .062$. We also observed a significant main effect of word count ($t(125) = 5.33, p < .001$), such that communal words were more common in more verbose memory descriptions. As expected, the implicit need for achievement was generally related to more agentic, and fewer communal words in participants' autobiographical diary entries.

Turning to Hypotheses 2a and 2b, we investigated whether favorable goal pursuit conditions (i.e., progress and attainability, respectively) were related to more agentic words. There was a marginal main effect of average goal progress ($t(125) = 1.74, p = .084$) predicting use of agentic words, such that individuals who reported more progress overall tended to use more agentic words, lending support to Hypothesis 2a. Day-to-day variation in goal progress was not significantly related to use of agentic words, $t(125) = .63, p = .532$. No significant main effects of average or daily goal attainability on use of agentic words were observed ($t < 1.36, p > .175$), which prompted us to reject Hypothesis 2b.

We then inspected whether progress (Hypothesis 3a) and attainability (Hypothesis 3b), indicating favorable goal pursuit conditions, would be related to fewer communal words in daily diary entries. Contrary to expectations, we found a significant main effect of average goal attainability ($t(125) = 3.41, p < .001$), such that individuals who rated their goals as more attainable in general used more communal words in their memories. The main effect for daily attainability was not significant ($t(125) = 1.18, p = .240$), nor were the main effects of average or daily goal progress, $t < 1.01, p > .314$.

Finally, we investigated potential interaction effects between goal characteristics and implicit and explicit motives on the content categories expressed in the daily diary entries. We particularly expected that highly achievement motivated people in favorable goal pursuit conditions would be most concerned with agentic themes in their daily memories (Hypothesis 4). We found some support for this notion when observing a marginal interaction between daily goal progress and the explicit achievement motive, $t(125) = 1.68$, $p = .095$. To explore the nature of this interaction, we examined the simple slopes of daily progress for individuals low (-1 SD) and high ($+1$ SD) in explicit achievement motive. As shown in Figure 1, for those low in explicit achievement motive, there was no association between daily progress and use of agentic words, $t(125) = 0.67$, $p = .507$. In contrast, those high in explicit achievement motive had a marginally positive association between daily progress and use of agentic words in their memories, $t(125) = 1.72$, $p = .088$.

To further investigate Hypothesis 4, we turned to goal attainability. There was a significant three-way interaction between implicit and explicit achievement motives and daily goal attainability, $t(125) = 2.02$, $p = .046$. We followed up on this interaction by examining the simple slopes of daily attainability for each combination of low (-1 SD) and high ($+1$ SD) implicit and explicit motives. As illustrated in Figure 2, these tests revealed a motive congruence effect: Individuals high on both implicit and explicit achievement motives had a positive association between daily attainability and use of agentic words, $t(125) = 2.37$, $p = .020$. This association was nonsignificant in the other combinations of motives ($t < 1.19$, $p > .240$). In other words, individuals who are high on both implicit and explicit achievement motives recollect memories richer in agentic words to the extent that they perceive higher attainability of their achievement goals on that day, which is in line with the pattern we predicted in Hypothesis 4.

3.2. Do motives and goal characteristics predict the affective tone of daily memories?

We next examined whether implicit and explicit motives, goal progress, and goal attainability predicted the use of positive and negative affect words in the memories reported each day. Looking first at the use of negative emotion words, there was a main effect of word count ($t(125) = 4.24$, $p < .001$), such that use of negative emotion words increased as the length of the memory increased. We also observed that people tended to use fewer negative emotion words on days of higher than average progress, $t(125) = -3.34$, $p = .001$. A similar effect appeared for attainability, such that negative emotion words were less frequent on days of higher than average attainability, $t(125) = -2.93$, $p = .004$. Neither of these effects was moderated by the implicit or explicit achievement motive.

Turning to the use of positive emotion words, there was a marginal two-way interaction between the implicit achievement motive and average goal progress, $t(125) = -1.83$, $p = .069$. As shown in Figure 3, the simple slopes analysis revealed that average progress was related to a nonsignificant increase in positive emotion words for those with a weak implicit achievement motive, $t(125) = 0.61$, $p = .545$. For those with a pronounced implicit achievement motive, however, high average progress predicted using significantly fewer positive emotion words, $t(125) = -2.13$, $p = .035$. For attainability, there was again a marginal interaction between the implicit achievement motive and average attainability, $t(125) = -1.80$, $p = .074$. The simple slopes analysis revealed that average attainability was significantly positively associated with use of positive emotion words for those with a weak implicit achievement motive, $t(125) = 2.04$, $p = .043$. For those with a strong implicit achievement motive, average attainability was not associated with the use of positive emotion words, $t(125) = -0.71$, $p = .479$ (see Figure 4).

3.3. Testing the reverse causal direction

The above analyses generally supported the set of hypotheses laid out in the introduction. However, the correlational nature of the data makes it difficult to infer the causal direction of the effects. That is, do motives influence the content of autobiographical memory, or might prior autobiographical memory and goal pursuit experiences have affected participants' scores on the baseline motive measures? To address this alternative possibility, we conducted a series of linear regression analyses predicting motive scores on the final (post-diary) survey from participants' autobiographical diary reports. More specifically, we conducted a series of analyses based on the following prototype:

$$M_{Fi} = b_0 + b_1 M_{iCi} + b_2 \bar{L}_{Ci} + b_3 \bar{P}_{Ci} + b_4 \bar{L}_{Ci} \bar{P}_{Ci} + b_5 \bar{A}_{Ci} + b_6 \bar{L}_{Ci} \bar{A}_{Ci} + \varepsilon_i \quad (2)$$

Here, M_{Fi} refers to one of the motive variables (implicit or explicit) in the final survey for person i , and M_{iCi} is person i 's initial level of the same motive. $\bar{L}_{Ci}$ is person i 's average value of a particular LIWC category (agentic, communal, positive emotion, or negative emotion) across the diary period, $\bar{P}_{Ci}$ is the same individual's average achievement goal progress across the diary period, and $\bar{A}_{Ci}$ is the individual's average achievement goal attainability across the diary period. The $\bar{L}_{Ci} \bar{P}_{Ci}$ and $\bar{L}_{Ci} \bar{A}_{Ci}$ terms indicate that the LIWC variables were allowed to interact with progress and attainability to predict final motives. All predictors in the model were centered at their grand means for these analyses.

Separate analyses were run for each motive variable and for each LIWC variable according to equation (2), for a total of 8 analyses and 40 possible links between LIWC variables, goal pursuit variable, and final motives. From this set of possible effects, only one reached significance: Adjusting for initial implicit achievement motive scores, individuals who used more positive emotion words in their memories during the diary period were higher in implicit achievement in the final survey, $t(115) = 2.08, p = .034$. Given only one significant effect out of 40, however, this result may very well be a type-I error. Thus, the data appear to be inconsistent with the original prediction that daily goal experiences and autobiographical memory content influence scores on the motive measures.

4. Discussion

We investigated how individuals' baseline implicit and explicit achievement motives and the characteristics of daily goal pursuit of self-chosen goals were associated with the features of autobiographical diary entries (as assessed by the text analysis program LIWC; Pennebaker et al. 2007). To our knowledge, the present study is the first to investigate these relationships in a daily diary design spanning several weeks. We set out proposing that personality motivation and goal characteristics would be related to both the *content* and the *affective tone* of daily autobiographical memories. Findings are summarized and discussed in this order.

4.1. Motives and Goal Characteristics predict the Content of Daily Memories

We found general support for our proposition that concerns for achievement (and, to a lesser extent, favorable conditions for pursuing one's goals) would be linked with using more agentic words and fewer communal words in daily autobiographical memories. In particular, we observed that the implicit achievement motive was associated with an increased number of agentic words in autobiographical diary entries, and a decreased frequency of communal words, which is in line with our first two predictions (Hypotheses 1a and 1b, respectively). Also, as expected, we found that the more participants made progress toward their goals over the study period, the more they used agentic words in their autobiographical recollections (Hypothesis 2a) – a pattern we did not find for goal attainability (Hypothesis

2b). We also did not find goal progress to be related to fewer communal words (Hypothesis 3a): Contrary to our expectations, we found that people who generally experienced their goals to be attainable included more communal words in their diary entries. When exploring the interaction effects between motives and goal pursuit on autobiographical memory, two findings emerged. First, we observed that individuals high in explicit achievement included somewhat more agentic words in their autobiographical memories on days when they experience progress towards their goal. This finding is in general agreement with the pattern we proposed in Hypothesis 4, that concerns for achievement and favorable conditions of goal pursuit would be related to the recall of more agentic words. We further observed that motive congruent individuals who had high scores both in the implicit and the explicit achievement motive recollected autobiographical memories that were richer in agentic words the more they perceived their goals to be attainable on a given day, which is also in agreement with the expectation formulated in Hypothesis 4.

We conclude that this pattern indicates that implicit and explicit concerns for achievement are generally associated with an increase in motive-related recall, which is in line with previous studies (Woike et al., 2003, 2009). This conclusion is also in agreement with the notion that (particularly implicit) motives orient, direct, and select attention (McClelland et al., 1989), such that people attend more to stimuli and process information better that is in line with their motivational disposition (see Woike et al., 2009). The outcomes associated with favorable goal pursuit characteristics, however, seem to be less consistent. Given their divergent consequences for predicting the agentic content of memories, it appears that making progress towards one's goal is experienced differently from feeling that one's goal is attainable. An important distinction might be that, particularly for the students in our sample, goal progress is something they themselves engage in, while the attainability of a goal may be better described as the property of a goal, and not a self-initiated action.

Individuals highly motivated for particularly implicit achievement often associate adversity during goal pursuit with positive emotions related to having mastered such challenges before (see Schultheiss & Brunstein, 2005). Gaining control of a difficult task can be hedonically gratifying, particularly for motivated individuals who quickly overcome the initial frustration and focus on the emotional reward of task completion (McClelland et al., 1953). Such people in turn invest more into effortful tasks when they have previously experienced solving such tasks (Eisenberger, 1992), and tend to realize their achievement motive in more approach-oriented, affectively positive ways even during, but not limited to, difficult tasks (see Kuhl & Beckmann, 1994, for an overview). In simplified words, when the going gets tough, the tough (i.e., the motivated) get going.

The findings from the present study seem complementary to this notion. We observed that, depending on their motives, people reacted differently when a goal was particularly easy to reach. We take the pattern of findings to suggest that favorable goal pursuit conditions (i.e., attainability) prompt people not motivated for implicit achievement to shift their focus away from agentic themes and towards communal topics, whereas individuals motivated for implicit achievement seem to maintain their priorities. In other words, it seems that when the going is relatively easy (signified by attainable goals), people have an increased capacity to focus on social themes, but the implicitly achievement-motivated, particularly when congruent with their explicit needs, keep going: They appear more persistent and focused on agentic themes, in line with previous research (Woike et al., 2009).

4.2. Motives and Goal Characteristics predict the Affective Tone of Daily Memories

We then inspected how the affective properties of the diary entries were related to goal pursuit and personality motivation. While we did not find any significant associations between goal pursuit conditions and positive affective tone of daily autobiographical diary

entries (Hypotheses 5a and 5b), we obtained the predicted pattern for negative affect: Favorable goal conditions (progress and attainability) were generally associated with a less negative affective tone in daily diary entries (Hypotheses 6a and 6b). On days when progress towards achievement goals was pronounced or when the goals were experienced as particularly attainable, negative affect in daily recollections was significantly reduced. We take this as an indication that the pursuit of meaningful goals is reflected in the emotions of recalled personal memories. It seems that pursuing one's goals under favorable conditions may not trigger particularly positive memories, but favorable goal conditions do seem to shield from negative autobiographical recollections.

The interaction effects for motives and goal characteristics shed light on the role of positive affect exhibited in diary entries in our study. We found that persons high in implicit achievement experienced fewer positive emotions in their autobiographical memories the more they experienced making great strides forward in reaching their goals over the course of the study. At first glance this may seem quite counterintuitive – since one could readily argue that the need for achievement is characterized by striving towards the hedonic experience of positive affect upon goal fulfillment (Woike, 2008). But the present study was concerned with the procedural aspects of goal pursuit, not its outcomes. The affect experienced is thus the one accompanying goal pursuit, not that of goal fulfillment. Still, why would participants who are motivated for implicit achievement not exhibit signs that they feel better when they experience progress towards their goals? The findings for individuals who are not motivated for implicit achievement provide a possible explanation. Persons low in implicit achievement exhibit significantly more positive affect in their diary entries the more they experience their goals as generally attainable. The complete pattern thus may suggest that individuals particularly motivated for implicit achievement may incorporate less positive affect into their diary entries when conditions are favorable because they may still be occupied with their goal pursuit. These findings may relate to different capacities for affect regulation (for an overview on action state orientation, see Baumann, Kaschel, & Kuhl, 2007; Kuhl, 1992; Kuhl & Beckmann, 1994). Put differently, it seems that focusing on achievable goals in the present and getting things done is not associated with having a lot of fun and happy social memories of the past. This reasoning is in line with our earlier finding of a pattern of persistence among highly motivated individuals: When things are going well, implicitly achievement-motivated individuals maintain their focus on agentic autobiographical themes and at the same time do not recall overly positive memories, which could be taken as an indication that as long as they are in pursuit of their goals, they do not experience positive hedonic rewards. People who are less motivated for implicit achievement, however, make time for communal themes and positive memories when things go smoothly and their goals seem attainable.

4.3. Limitations and Future Perspective

There are several limitations that need to be considered for future studies. First, the college/university context in which we assess the data needs to be acknowledged. It naturally lends itself to a dedicated inspection of the achievement motive, as one could argue that the salience of such themes may be higher than in other contexts. This notwithstanding, future studies should include not only samples from other contexts (including a larger proportion of male participants, underrepresented in the current study), but also need to investigate whether the patterns that we have observed hold more generally.

Second, the design of our study does not permit a conclusive test of the causal direction of the relationships under investigation. That is, although our perspective suggests that the achievement motive exerts a causal influence (both directly, and as a moderator) on people's autobiographical experiences, the correlational nature of the current study cannot speak directly to such causal links. Previous studies have clarified that there is indeed a reinforcing

link between motives and memories, which could represent mutually constituent elements (see Woike, 2008). The analyses reported at the end of the results section provide some evidence that people's goal pursuit experiences and autobiographical memories during the diary period were not influencing their implicit and explicit motives, which reinforces our confidence in our conclusions. Additionally, we maintain that the strength of the current study does not lie in its ability to inform a causal process *per se*, but rather in its ability to depict a motive-relevant phenomenon as it operates in the context of real-world goal pursuit. The richness of the data and ecological validity obtained in the present study would be difficult to obtain in an experimental context, where causal processes could be more specifically identified. Thus, we recognize that a complete program of research on the links between motives and autobiographical memory should balance the richness of correlational data with the control of experimental data.

Third, it might be argued that participants become more aware of the observed behavior in a diary study, which might distort findings. Bolger and colleagues (2003) provide a thorough discussion of this possibility. Although there remain many unanswered questions about how daily responding affects participants, there is some evidence that the consequences may be minimal in this instance. For instance, being aware that a particular behavior is being observed does not necessarily imply that participants will become reactive. Litt and colleagues (1998) found that an observed behavior (alcohol consumption) did not necessarily change in frequency as a consequence of diary reporting. Additionally, we believe that, even if participants did become aware of the concepts being studied, it is unlikely that they could have anticipated the types of analyses reported here.

Fourth, one could assume that the relationship between linguistic markers assessed with LIWC and implicit motives may just represent a methodological overlap between the two coding systems. There are two specific reasons why we think this is an unlikely explanation for the present findings. First, both coding systems were executed on differently designed materials. While the manual by McClelland and colleagues (1953) was applied to the PSEs the participants worked on in the initial and final sessions of the diary study, the text analysis with LIWC was carried out on the participants' daily autobiographical memories. Both types of texts were unobtrusive but differed in what was being assessed. Furthermore, the relationship between LIWC and implicit motives has been investigated previously. The need for achievement was correlated to some extent with LIWC categories, which ultimately led to the composition of a specific achievement category in the present LIWC coding system (Pennebaker & King, 1999). However, while some aspects of the achievement motive can be assessed with this measure, and there is thus certainly a relationship, the "kinds of contingencies required for TAT [PSE] coding are impossible to detect with a word count strategy" (Pennebaker & King, 1999, p. 1306).

Fifth, we were surprised that we found only effects of the implicit and not the explicit achievement motive on memory content. In hindsight, however, this pattern may make sense: Daily diary entries might lend themselves less to purely informative, structured self-descriptions (which are assumed to be associated with the explicit motive), and probably more to vivid recollections of particular moments in time, which may be more connected to the implicit motivational system (Woike, 2008). It might well be that a memory instruction less geared towards a procedural, experiential quality may have produced a different constellation: Asking for a self-descriptive memory might have, for example, produced diary entries that could have been more related to the explicit achievement motive. To address this issue in future studies, we recommend a variation of instructions along these lines, or the inclusion of self-report measures such as the Thinking About Life Experiences questionnaire by Bluck and colleagues (Bluck, Alea, Habermas, & Rubin, 2005).

Sixth, due to the absence of previous studies that investigated the relationship between implicit and explicit achievement motives, goal pursuit characteristics and autobiographical memory, we have refrained from making too specific predictions, but have instead proposed a general patterns of results (Hypothesis 4 and 7). Future studies may be able to commit to more specific predictions. By analyzing the rich open-ended data from our longitudinal diary study with multilevel modeling, we gained a better understanding of the motivational and goal-related antecedents of autobiographical memory in a fashion that a cross-sectional or experimental study could not have achieved: These would lack either the potential to interpret motives and goal characteristics as antecedents or they would lack the ecological validity of a diary study, respectively. For these reasons, we are confident in the presented data, and optimistic that it has laid the foundation for future studies.

4.4. Conclusions

Taking a bird's eye perspective on the pattern of findings in the present study, it is interesting to note that the implicit need for achievement not only goes together with a heightened focus on agency-related topics in the recall of personally relevant memories, but it is also connected to a lowered frequency of communal topics in these memories. This is much in line with the general idea of Bakan (1966) to distinguish between agentic and communal motivational preferences that may even come at each other's expense. While there already have been a number of studies examining the everyday importance of autobiographical memories, for example, for relationship maintenance and intimacy (Alea & Bluck, 2003, 2007) and empathy (Bluck, in press; Pohl, Bender, & Lachmann, 2005), studies on everyday memories with self-directed, agentic functions seem less frequent (but see, among others, Bluck & Alea, 2008; Pillemer, 2003) – which underlines the importance of the present set of findings. While it may be too early to arrive at firm conclusions about this trade-off between agentic and communal themes (which resonates with a work/love distinction), and the accompanying role of affect, we are hopeful that the findings of the present study will stimulate further research to better understand such patterns at the intersection of motives, goals, and memories.

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HIGHLIGHTS

- Online diary study on motivation, goal characteristics and autobiographical memory.
- Implicit achievement related to more agentic (fewer communal) words in diary memories.
- Goal progress related to more agentic, goal attainability to more communal words.
- People low in achievement: room for social topics under favorable goal conditions
- People high in achievement: focus on goal pursuit irrespective of goal conditions

Figure 1.

Frequency of agentic words in daily autobiographical memories as a function of explicit achievement motive and daily achievement goal progress.

Figure 2.

Frequency of agentic words in daily autobiographical memories as a function of implicit achievement motive and daily achievement goal attainability, plotted separately for individuals (i) low and (ii) high in explicit achievement motive.

Figure 3.

Frequency of positive emotion words in daily autobiographical memories as a function of implicit achievement motive and average achievement goal progress.

Figure 4. Frequency of positive emotion words in daily autobiographical memories as a function of implicit achievement motive and average achievement goal attainability.

Correlation matrix of study variables

Table 1

	Word count	Imp. ach. (initial)	Exp. ach. (initial)	Average progress	Average attain.	Agentic words	Comm. words	Positive emotions	Negative emotions	Imp. ach. (final)	Exp. ach. (final)
Memory word count	1.00										
Implicit ach. (initial)	-.06	1.00									
Explicit ach. (initial)	.20*	-.06	1.00								
Average progress	.06	.02	.33*	1.00							
Average attainability	.15+	.01	.18*	.47*	1.00						
Agentic words	-.17*	.21*	.02	.06	-.06	1.00					
Communal words	.16+	-.20*	.06	.11	.30*	-.35*	1.00				
Positive emotions	-.09	.04	.00	-.10	.04	-.13	.17*	1.00			
Negative emotions	.08	.07	.09	.02	.09	-.11	.14	.08	1.00		
Implicit ach. (final)	.06	.32*	.02	-.03	-.04	-.01	.04	.22*	.02	1.00	
Explicit ach. (final)	.18*	-.12	.77*	.39*	.25*	.04	.03	.00	.00	.01	1.00
MEAN	93.49	4.85	10.99	2.42	2.61	2.01	7.92	3.33	1.43	4.66	10.69
SD	45.68	3.73	3.04	0.75	0.57	0.83	2.43	1.16	0.75	3.47	3.18

* $p < .05$.