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## Epistemic constraint and teaching style

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## Abstract

An experimental study investigated the influence of informational dependence on information appropriation as a function of epistemic authority's styles. In a 2 x 2 design, university students were informed that acknowledging epistemic dependence was related either to academic success or to academic failure, and were exposed to controversial information from an epistemic authority that used either an authoritarian or a democratic style. The main dependent variable was the extent to which participants appropriated the controversial information. Firstly, the results showed that students were more inclined to admit that their own academic competence depended on the information delivered by the teachers when epistemic dependence was related to success rather than to failure. Secondly, the admittance of dependence had a different impact on information appropriation according to the authority's style. Admittance increased appropriation under a democratic style whereas it decreased appropriation under an authoritarian style.

According to the correspondence hypothesis (cf. Quiamzade et al., 2004), appropriation of information provided by an epistemic authority depends on the teaching style of the authority (for a different application of this hypothesis, see Tomasetto, 2004), designed according to Lewin, Lippitt and White's (1939) distinction between authoritarian and democratic styles. However, the influence of the teaching style seems to be moderated by perceptions of self-competence. In educational settings (i.e., at university), the democratic style increased appropriation of information specifically when students perceived themselves as somewhat competent (Mugny, Quiamzade, Pigièrre, Dragulescu & Buchs, 2002), when they had reached a more advanced academic degree (Quiamzade, Mugny, Dragulescu & Buchs, 2003), or when social comparison with the source was constraining (Quiamzade, Mugny, & Buchs, 2005). Overall, these findings suggest that students with positive views of themselves in terms of competence need a teaching style that takes their competence and their views into consideration, whereas students with negative views of themselves in terms of competence need a more directive teaching style that provides them with clear-cut guidelines to learn.

Another way to examine this issue is to focus upon the role of perceived informational dependence. Indeed, appropriation of knowledge in educational settings is grounded in the relationship between students and the epistemic authority in terms of informational dependence (Mugny, Butera, Quiamzade, Dragulescu, & Tomei, 2003). Deutsch and Gerard (1955, p. 629) defined informational influence as “an influence to accept information obtained from another as evidence about reality” which is related to uncertainty about self judgments and certainty about other’s correctness. Informational dependence can be seen as the degree of dependence which uncertain people feel vis-à-vis a recognized and legitimated source (Tyler, 1997). According to the research described previously, it has been observed that a democratic style produced more influence among students who perceived themselves as more independent from the epistemic authority (Mugny, Chatard, & Quiamzade, 2006), while an authoritarian style led to more influence among students who perceived themselves as more dependent (Mugny, Quiamzade, & Trandafir, 2006).

Despite the clear pattern of findings provided by these researches, one remaining question is whether an authoritarian style always facilitates learning when informational dependence is high, and whether a democratic style always facilitates more learning when informational dependence is low. Indeed, there are reasons to believe that informational dependence may constitute a source of threat that would benefit from a democratic teaching style rather than an authoritarian one. For instance, the social comparison may be threatening because of an epistemic gap (Ellis & Kruglanski, 1992). The superiority of the source then becomes problematic for the self (Morse & Gergen, 1970), and the dependence is perceived as a constraint to accept the authority’s advocated position, a dynamic that blocks influence (Mugny, Tafani, Falomir & Layat, 2000). In such a case, the authoritarian teaching style may constitute a threat because it renders unavoidable the recognition of self-inferiority and the agreement with the source. Another example is reactance theory (Brehm, 1966; Brehm & Brehm, 1981), where a threat leads to blockage of influence whatever the specific process (Silvia, 2006). A threat produces reactance when the source is highly competent and dependence is then increased (Brehm, 1966). Furthermore, the more the freedom is important, the more the dependence upon the source leads to reactance (Brehm & Mann, 1975). In such a case, the authoritarian teaching style may constitute a threat to individuals’ freedom. Thus, informational dependence can be perceived as an unavoidable obligation or constraint to accept the authority’s position (i.e., as threatening individuals’ freedom), and the democratic

style (compared to the authoritarian style) should then be more efficient in inducing appropriation.

In sum, previous research showed that teaching style obtained more influence when it matched students' needs in terms of perceived dependence upon the epistemic authority (Mugny, Chatard, & Quiamzade, 2006; Mugny, Quiamzade, & Trandafir, 2006): perceived dependence facilitated the influence of an authoritarian style whereas perceived independence facilitated the influence of a democratic style. The reason may be that in most of the situations that have been studied before, dependence was not a source of threat, because the educational setting that was used legitimated dependence. In such a context the dependence relationship with the source is not only accepted but is also expected by the target. However, given that perceived dependence may also be considered as a source of threat to students' freedom, teaching style may work by changing this meaning. Perceived dependence may also be perceived as a threat, and in this case an authoritarian style may reinforce such a threat whereas a democratic style may release it. As a consequence, dependence can be a source of threat hindering the appropriation of knowledge when the teaching style is authoritarian, whereas the same dependence may be a motivational basis for learning, when the teaching style is democratic. Indeed, as targets in an educational setting are motivated to find correct solutions and increase their knowledge, once the threat is reduced and the targets do not need to protect the self any longer, the source of influence again becomes the real and legitimate provider of information. As dependence towards the source in this setting means that students can rely on the epistemic authority to learn, higher dependence should then produce higher influence.

One way to give informational dependence the meaning of a constraint to accept the epistemic authority's position consists of forcing students to endorse dependence. Indeed, whereas *acknowledged dependence* may translate people's motivation to recognize an epistemic authority, *forced dependence* may translate people's feeling of obligation to accept its positions against their personal need of freedom. One should understand the former notion as a dependence to which the context gives the meaning of a freely accepted asymmetry with the source, i.e. leading by default to a real informational dependence process (Deutsch & Gerard, 1955). It is the case in educational settings in which a didactic contract between the source and the target assigns to each one a position of teacher versus learner (Schubauer-Leoni, 1989), as it can be in contexts where institutional dimensions legitimate the superiority of the source in the influence relationship and thus makes the informational influence a

normal process (Guimond, 1998; Milgram, 1974; Newcomb, 1943; Quiamzade & Mugny, 2004). In contrast, the notion of forced dependence refers to a dependence in which the context gives the meaning of an imposed asymmetry with the source, i.e. leading by default to an informational constraint process (see Falomir, Mugny, Sanchez-Mazas, Pérez, & Carrasco, 1998). Similarly to external constraints or reinforcements it blocks interiorization and leads at best to compliance (cf. Kelman, 1958) or imitation (Quiamzade, Tomei, & Butera, 2000).

As a consequence, as studied in previous experiments, acknowledged dependence may lead to a greater influence in particular when the epistemic authority uses an authoritarian style, whereas in the present study we formulated the hypothesis that forced dependence should lead to a higher influence with a democratic rather than authoritarian style.

### Overview of the study

In order to manipulate the extent to which students may feel forced to accept informational dependence, in the present study we focused on the instrumental value of dependence. Participant students were first informed that previous research had shown that informational dependence acknowledgement was related either to academic failure or to academic success. We expected students to be constrained to admit dependence in the academic success condition in comparison to the academic failure condition. Afterwards, participants were exposed to controversial information delivered by an epistemic authority using either an authoritarian or a democratic teaching style. The main dependent measure was the extent to which students appropriated the controversial information provided by the epistemic authority.

Constraint should produce acceptance of dependence. However, it was expected that this acceptance should mediate a positive influence process only when the context reduces the threat that the forced dependence represents. Indeed, under threat no influence process should appear at all. In other words, we predicted that the more students admit dependence when constrained to do so (i.e., academic success condition), the greater the influence when the style is democratic rather than authoritarian (i.e., when the style releases the constraint).

### Method

*Participants and procedure.* Participants were 135 second year psychology students (119 women; median age = 21 years) from the University of Geneva. The experiment took place at the very beginning of the academic year. Participants were randomly assigned to one of the four conditions in a 2 (constraint : high vs. low) x 2 (style : democratic vs.

authoritarian) design. After some demographical questions (sex, age, and native country), all students filled out tasks in the following sequence.

*Initial representation of an ideal group of friends.* Participants had to read the brief description of a bogus study on members' satisfaction in friendship groups published in a scientific peer review journal, and to guess the findings. To do this, they had to estimate the means of satisfaction observed among various groups of friends, as a function of the degree of leadership observed in these groups. Previous research using the paradigm of an ideal group of friends has consistently documented that students predominantly believe that an ideal group of friends is a group without a leader; this finding was replicated in the present study (for details, see Quiamzade, Mugny, & Chatard, in press).

*Constraint to dependence recognition.* Participants were then informed that our research group had studied factors facilitating or hindering academic success, and in particular factors such as students' recognition that their competence in psychology depends on the information delivered by their teachers. Bogus results were given in a figure summarizing the academic success and failure during a 6 year period of students who at the beginning of each academic year admitted versus did not admit that their competence depended on their epistemic dependence towards their teachers. In the high constraint condition, participants were informed that those who did admit their epistemic dependence achieved much higher grades (over the 6 years 65% got their grades) than those who did not (only 35% got them). In the low constraint condition the reverse appeared to be true. In order to check recognition of induction content, participants had to infer from the figure the mean percentage of successful students among those who admitted their epistemic dependence and among those who did not.

*Acceptance of epistemic dependence.* Own perceived epistemic dependence was then assessed as a measure of acceptance of dependence. Participants had to express in a percentage the degree to which they personally admitted that their competence in psychology depended upon the information delivered by their teachers.

*Style of the epistemic authority.* Bogus results of the study on group satisfaction published in a scientific peer reviewed journal were then presented. A graph showed that the highest means of satisfaction were observed among groups of friends characterized by a high percent of leadership, and the author's conclusion was that "an ideal group of friends is a group in which high levels of leadership are observed". In one condition, this conclusion was framed in an authoritarian style ("I would never allow a student to pass who claimed the

opposite, whatever his or her arguments are”). In another condition, this conclusion was framed in a democratic style (“I would never refuse to allow a student to pass, if his or her arguments are well-formulated”). The style manipulation was then fully relevant to the manipulation of constraint to dependence recognition. Two items were used to check the manipulation of the style of the epistemic authority: participants indicated to what extent they thought that the conclusions were authoritarian, and democratic (1= not at all, 7= totally).

*Appropriation measure.* The source’s influence has been measured by the extent of centrality of the belief in equality in the representation of an ideal friendship group. Participants had to read the summary of a case study of a group of friends. In this group of friends, high levels of satisfaction appeared among its members despite the fact that there were hierarchical relationships between the leaders and other members of the group. Participants were asked to indicate to what extent they judged that this group can be considered as an ideal group of friends (1= it is clearly an ideal group of friends, 8= it is clearly not an ideal group of friends). Lower scores indicate more influence of the epistemic authority, i.e., more appropriation of the contradictory information.

## Results

*Recognition of induction content.* As they strongly correlated ( $r = -0.77$ ) the two mean percentages (inferred from the figure) of successful students have been aggregated in one single index (with one item inverted). A regression analysis has been run on the aggregated index as the explained variable and including as predictors the two manipulated variables (low vs. high constraint coded 1 and -1; authoritarian vs. democratic style code 1 and -1) and own perceived epistemic dependence (centered), as well as all possible interactions. Only the main effect of the constraint manipulation appeared: This effect indicated that students who admit dependence were considered to be more successful ( $M=62.52\%$ ,  $SD= 4.74$ ) in the high constraint condition than in the low constraint condition ( $M=38.71\%$ ,  $SD= 7.16$ ),  $\beta = .87$ ,  $t(127) = 20.17$ ,  $p < .001$ . Moreover, one should note that this measure correlates with the acceptance of dependence,  $r(134) = .42$ ,  $p < .001$ . This is coherent with the fact that the same main effect appears on the latter measure (see below information appropriation section).

*Style perception.* The same analysis on the two style perception measures aggregated ( $r = .49$ ; ‘democratic’ score inverted) showed only a main effect of the style of the source: the conclusion of the epistemic authority was perceived as more authoritarian when the style was

authoritarian ( $M = 5.20$ ,  $SD = 1.45$ ) rather than democratic ( $M = 3.24$ ,  $SD = 1.70$ ).  $\beta = -.60$ ,  $t(127) = 7.77$ ,  $p < .001$ .

*Information appropriation.* To check the hypothesis that admittance of dependence should mediate the effect of constraint on influence differently under democratic style and authoritarian style, a moderated mediation has been realized. To do so, three equations were run:

$$(1) Y = b_{1,0} + b_{1,1} * X + b_{1,2} * Mo + b_{1,3} * X * Mo + e_{1,i}$$

$$(2) Me = b_{2,0} + b_{2,1} * X + b_{2,2} * Mo + b_{2,3} * X * Mo + e_{2,i}$$

$$(3) Y = b_{3,0} + b_{3,1} * X + b_{3,2} * Mo + b_{3,3} * X * Mo + b_{3,4} * Me + b_{3,5} * Mo * Me + e_{3,i}$$

where:

$Y$  is the social influence dependent measure;

$Mo$  is the supposed moderator, i.e., the style (democratic vs. authoritarian, coded 1 and -1) of the source;

$Me$  is the supposed mediator, i.e., the continuous variable of acceptance of dependence (centered);

$X$  is the predictor, i.e., the constraint (high vs. low, coded 1 and -1).

To obtain a perfect moderated mediation, parameters which have to be significant are:  $b_{1,1}$ ,  $b_{2,1}$  and  $b_{3,5}$ ; moreover  $b_{1,3}$  and  $b_{3,3}$  should be different. The main effect of constraint on influence in equation (1) did not reach the classical significance threshold,  $\beta_{1,1} = -.19$ ,  $t(131) = 1.44$ ,  $p = .15$ , suggesting that -if any effect- participants were more influenced when constrained to admit dependence ( $M = 4.21$ ,  $SD = 1.53$ ) than when not ( $M = 4.59$ ,  $SD = 1.54$ ). However, such an effect is not necessary for mediation when  $N$  is small (see Fritz & MacKinnon, 2007)<sup>1</sup>. Moreover, we do not expect this effect to be strong because theoretically the constraint is supposed to block any influence under authoritarian style, which can statistically reduce the main effect on the whole sample. We then proceeded with the next steps of the moderated mediation. No other effect appeared in equation (1). Moreover, in equation (2) the only significant effect was the main effect of the constraint,  $b_{2,1} = 6.35$ ,  $t(131) = 4.50$ ,  $p < .001$ , indicating that participants were more likely to admit the dependence when constrained to do so ( $M = 61.97$ ,  $SD = 17.00$ ) than when not constrained ( $M = 49.20$ ,  $SD = 15.54$ ). In equation (3) the only significant effect was the interaction between the style and the acceptance of dependence  $b_{3,5} = -.02$ ,  $t(129) = 2.05$ ,  $p < .05$ . Finally, the comparison between



the two same interactions of the style and the constraint in equations (1) and (3) showed that  $b_{1.3} = .02$  was smaller than  $b_{3.3} = .13$ ,  $Z = 10.60$ ,  $p < .001$ .

These results partially confirm the different dynamics induced as a consequence of each of the styles. In order to test the hypothesis that a positive influence process should appear under a democratic style but not under the authoritarian style, direct tests of the slopes have been conducted. As expected an increased acceptance of dependence led to appropriation under the democratic style ( $b = -.02$ ,  $t(131) = 1.68$ ,  $p < .05$ , one-tailed<sup>2</sup>) but such an increase did not lead to any appropriation under the authoritarian style ( $b = .02$ ,  $t(131) = .93$ ,  $p < .35$ ).

Insert table 1 around here

In summary, the results showed a moderated indirect effect, but not a perfect moderated mediation. Firstly, acceptance of dependence was higher in the dependence-success condition than in the dependence-failure condition. Secondly, forced acceptance of dependence produced a different effect on appropriation as a function of teaching style.

### Discussion

A difference between the two styles in the processes leading to social influence was expected. The results partially confirmed the hypothesis. On one hand, we did not find a perfect moderated mediation, derogating the hypothesis. Results showed that the main effect of constraint on influence did not clearly appear. This can be due to several reasons. Firstly, as suggested, this may be due to lack of power because of a small N in such kinds of analysis. Secondly, it is probably due to theoretical reasons. As it is presumed that the constraint under authoritarian style does not lead to any influence or blocks it, a lesser statistical link in this condition may have reduced the global effect of constraint on the influence. Indeed, when the link between the predictor and the dependent variable is lower or even negative in one condition of the moderator (e.g. under authoritarian style the more they feel constrained the less they are positively influenced) it is not so curious that the main effect fails to reach statistical significance: the absence of a link (or a negative link) in one condition impedes the main effect to appear when cumulating both conditions. Moreover, one can also suppose that it can be due to an individual difference in constraint perception and meaning according to the competence level of the participants: more incompetent people may have been less constrained than more competent ones, the former reducing the effect of constraint on the influence produced by the latter. We know that the beneficial effect of a democratic style and

the detrimental effect of an authoritarian style specifically concerned people who felt somewhat competent (cf. Mugny et al., 2002).

On the other hand, the results showed an indirect effect congruent with expectations. Globally, the institutional constraint induced through the success/failure induction forced the students to accept the dependence independently of style. On this basis, a difference between styles appeared. It seemed that the more they accepted the dependence, the more they were influenced when the democratic style attenuated the constraint. In contrast, for the authoritarian style, any positive influence was blocked when dependence was accepted. Yet, another prediction could have been that the reverse should be true when informational dependence is not construed as a personal threat. However, due to some cultural differences the specific effects of each style vary accordingly. In particular, no study was able to find a significantly superior influence of the authoritarian style in French speaking samples when informational dependence was not construed as a personal threat (Mugny et al., 2002; Quiamzade et al., 2003, 2005), whereas it was the case in Eastern European samples (Mugny, Quiamzade, & Trandafir, 2006; Quiamzade et al., 2003). As the present sample was a French speaking one, we could not expect a superiority of the authoritarian style when there is no constraint, which is what we found.

In summary, even if the results do not give complete satisfaction, they are congruent with previous observations. In particular, it clearly appears that when people are threatened, they need a democratic style in order to be influenced. If the present experiment showed that the dynamics regarding threat and informational dependence can be somewhat interrelated in a complex fashion, future research is needed to disentangle the dynamics of acknowledged dependence and forced dependence.

## References

- Brehm, J. W. (1966). *A theory of psychological reactance*. New York: Academic Press.
- Brehm, J. W., & Mann, M. (1975). Effects of importance of freedom and attraction to group members on influence produced by group pressure. *Journal of Personality and Social Psychology*, 31, 816-824.

- Brehm, S., & Brehm, J. W. (1981). *Psychological reactance: A theory of freedom and control*. New York: Academic Press.
- Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology*, 51, 629-636.
- Ellis, S., & Kruglanski, A. (1992). Self as an epistemic authority: effects of experiential and instructional learning. *Social Cognition*, 10, 357-375.
- Falomir, J. M., Mugny, G., Sanchez-Mazas, M., Pérez, J. A., & Carrasco, F. (1998). Influence et conflit d'identité : de la conformité à l'intériorisation. In J.-L. Beauvois, R.-V. Joule & J.-M. Monteil (Eds.), *Perspectives cognitives et conduites sociales*. (Vol. 6, pp. 313-339). Neuchâtel: Delachaux et Niestlé.
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, 18, 233-239.
- Guimond, S. (1998). Processus de socialisation dans l'enseignement supérieur. In J.-L. Beauvois, R.-V. Joule & J.-M. Monteil (Eds.), *20 ans de psychologie sociale expérimentale francophone*. (pp. 231-272). Grenoble : Presses Universitaires de Grenoble.
- Kelman, H. C. (1958). Compliance, identification and internalization: Three processes of attitude change. *Journal of conflict resolution*, 2, 51-60.
- Lewin, K., Lippitt, R., & White, R. H., (1939). Patterns of aggressive behaviour in experimentally created social climates. *Journal of Social Psychology*, 10, 271-299.
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological methods*, 7, 83-103.
- Milgram, S. (1974). *Obedience to authority*. New York: Harper and Row.
- Morse, S., & Gergen, K. J. (1970). Social comparison, self-consistency, and the concept of self. *Journal of Personality and Social Psychology*, 16, 148-156.

- Mugny, G., Butera, F., Quiamzade, A., Dragulescu, A., & Tomei, A. (2003). Comparaisons sociales des compétences et dynamiques d'influence sociale dans les tâches d'aptitudes. *Année Psychologique*, 103, 469-496.
- Mugny, G., Chatard, A., & Quiamzade, A. (2006). The social transmission of knowledge at the university: Teaching style and epistemic dependence. *European Journal of Psychology of Education*, 21, 413-427.
- Mugny, G., Quiamzade, A., Pigièrè, D., Dragulescu, A., & Buchs, C. (2002). Self-competence, interaction style and expert social influence : Toward a correspondence hypothesis. *Swiss Journal of Psychology*, 61, 153-166.
- Mugny, G., Quiamzade, A., & Trandafir, A. (2006). Dépendance informationnelle et styles de comportement dans l'influence sociale. *Psihologie sociala*, 17, 43-56.
- Mugny, G., Tafani, E., Falomir, J.-M., & Layat, C. (2000). Source credibility, social comparison and social influence. *International Review of Social Psychology*, 13, 151-175.
- Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology*, 89, 852-863.
- Newcomb, T. M. (1943). *Personality and social change : attitude formation in a social community*. New York : Holt, Rinehart and Winston.
- Quiamzade, A, & Mugny, G. (2004). Les niveaux d'analyse : le cas de l'influence des sources compétentes. *Nouvelle Revue de Psychologie Sociale*, 3, 65-72.
- Quiamzade, A., Mugny, G., & Buchs, C. (2005). Correspondance entre rapport social et auto-compétence dans la transmission de savoir par une autorité épistémique: une extension. *Année Psychologique*, 105, 423-449.
- Quiamzade, A., Mugny, G., & Chatard, A. (in press). When teaching style matches students' epistemic (in)dependence: The moderating effect of perceived epistemic gap. *European Journal of Psychology of Education*.

- Quiamzade, A., Mugny, G., Dragulescu A., & Buchs, C. (2003). Interaction styles and expert social influence. *European Journal of Psychology of Education*, 18, 389-404.
- Quiamzade, A., Mugny, G., Falomir, J. M., Invernizzi, F., Buchs C., & Dragulescu, A. (2004). Correspondance entre style d'influence et significations des positions initiales de la cible : le cas des sources expertes. In J.-L. Beauvois, R.-V. Joule & J.-M. Monteil (Eds.). *Perspectives cognitives et conduites sociales*. (Vol. 9, pp. 341-363). Rennes : Presses Universitaires de Rennes.
- Quiamzade, A., Tomei, A., & Butera, F. (2000). Informational dependence and informational constraint: social comparison and social influences in anagram resolution. *International Review of Social Psychology*, 13, 123-150.
- Schubauer-Leoni, M. L. (1989). Problématisation des notions d'obstacle épistémologique et de conflit socio-cognitif dans le champ pédagogique. In N. Bednarz & C. Garnier (Eds.), *Construction des savoirs*. (pp. 350-363). Ottawa : Agence d'ARC Inc.
- Silvia, P. J. (2006). Reactance and the dynamics of disagreement : Multiple paths from threatened freedom to resistance to persuasion. *European Journal of Social psychology*, 36, 673-685.
- Tomasetto, C. (2004). Influence style and students' orientation toward extra curricular activities: An application of the correspondence hypothesis. *European Journal of Psychology of Education*, 19, 133-145.
- Tyler, T. R. (1997). The psychology of legitimacy: A relational perspective on voluntary deference to authorities. *Personality and Social Psychology Review*, 1, 323-345.

Table 1. Regression parameters for the three equations of the moderated mediation

	$b_{i0}$	$b_{i1}$	$b_{i2}$	$b_{i3}$	$b_{i4}$	$b_{i5}$
Equation 1	4.41*	-0.19	-0.05	0.02	-	-
Equation 2	0.18	6.35*	-1.19	0.59	-	-
Equation 3	4.38*	-0.20	-0.04	0.13	0.00	-0.02*

\*  $p < .05$

## Notes:

<sup>1</sup> Some researchers estimate that this condition has to be fulfilled (see Muller, Judd & Yzerbyt, 2005) while others estimate that it is not necessary. Due to the weak power such a condition requires a very large sample to be fulfilled (see Fritz & MacKinnon, 2007; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Since usual samples are small they do not allow for acceptable p-values to be produced for this effect, whereas a moderated mediation may exist. In our case the effect size is 0.13 and for an  $\alpha$  error probability of .05 the power ( $1-\beta$ ) is 0.31. Therefore, we only have a 31% chance with our sample size to detect the main effect if it exists.

<sup>2</sup> According to our hypothesis we expected a positive slope. A significant but negative slope as well as a null slope would disconfirm our expectation. That is why we tested only the presence of a positive link and used a one-tail test in order to avoid dividing the alpha risk error between the two sides of the distribution.