

Original Papers

Polish Psychological Bulletin
2013, vol. 44(1), 70-84
DOI -10.2478/ppb-2013-0008

Józef Maciuszek*

Don't pay attention to what you see! Negative commands and attention bias

Abstract The paper presents research into the effects of the use of negations in directives (orders, suggestions, requests). Three experiments are described that tested the effects of instructions formulated in various ways: direct (pay attention to) and negated (don't pay attention to) commands to focus the attention. Indicators of attention focusing that were used include: the correctness of answers to questions about a selection of comic book pages (Experiment 1); the time needed to name the colours of stimulus words and the level of recall of these words after completion of the colour naming task (Experiment 2 and 3). The results showed that a direct command influenced all indicators of attention focusing. However, a negated command increased the level of recall of details about the comic book pages, as well as the level of key word recall. Both the automatic process that generates the paradoxical effects of negated commands, as well as the controlled process of reasoning, may be responsible for the results of the memory task.

Key words: negation, directives, attention focusing

Introduction

Negation is an important element of everyday communication and an integral part of social cognition and behaviour (Deutsch, Kordts-Freudinger, Gawronski and Strack, 2009). It manifests itself mainly in volitional, logical and corrective aspects. The volitional character of negation is present particularly when we express disagreement, refusal (*I don't want this*), or objection, as well as in attempts to control somebody else's (or our own) behaviour, such as when we forbid someone to do something (*Don't smoke in here!*, *Don't go there!*) (Yaeger-Dror, 2004). The logical-corrective function of negation, on the other hand, has to do with reversing meaning, disclosing the falsehood of somebody's statement, correcting statements and denial (e.g. *this is not right!*, *he didn't do it!*). Negative statements do not have to directly state the falsity of a sentence, but they may merely correct a possible mistaken expectation. Wason (1965) thought that we used negations when the normal course of events had been altered, when something

contrary to our convictions or expectations had occurred (e.g. *John wasn't late for work today* suggests that he usually is).

In everyday communication, it is often the negated commands, requests, and suggestions etc. which are the signs of volitional negation. Generally, this type of message refers to a state of mind, i.e. emotional states (*Don't worry*), or the subject of concentration, thinking, attention focusing (*Don't think about the failure. Don't pay attention to his appearance. Don't imagine that you are going to be sick*). Negated directives also refer directly to behaviour: *Don't cry. Don't be late. Don't fall down*.

The main issue addressed by this article is the possible paradoxical effects of using negation in orders, suggestions and requests, sentences which are referred to as directives in the theory of speech acts (Austin, 1962). The aim of this paper is to present the results of my own research into the paradoxical effects of using negated directives, specifically with regard to focusing attention and the automatic character displayed by this effect.

* Jagiellonian University, Institute of Applied Psychology, 30-348 Cracow, ul. prof. Łojasiewicza 4, e-mail: jozef.maciuszek@uj.edu.pl.

This research was supported by Grants (N N 106 133136) in the years 2009–2013 from the Polish Ministry of Science and Higher Education

Negation in directives and paradoxical effects of negated commands

Generally speaking, directives are imposing statements, suggesting or proposing an activity, behaviour or reaction (Lyons, 1977). Directives (commands, requests, recommendations, persuasions, suggestions etc.) are often used in a negated form. These are mostly prohibitions, which are recommendations to refrain from doing something (e.g., *Don't walk on the floor. It's wet!*) However, negated directives are not only prohibitions but also suggestions for specific behaviours and responses. When somebody says to you *Don't forget!* or *Don't worry!*, it is not thought of as a prohibition but as an expression of a positive intention, a form of advice to remember something or to keep your spirits high. One might even be tempted to introduce a certain gradation of negated commands on a continuum from prohibitive commands to encouragement: (1) *Don't walk in here!* (prohibition) (2) *Be careful, don't fall down!* (warning) (3) *Don't forget it!* (appeal) (4) *Don't worry!* (an encouragement to respond or behave in a positive way).

It is likely that most of us have experienced paradoxical responses to negated directives, that is, the kind of responses which contradict the intention embedded in the sentence communicated to us. These responses may occur in respect of emotional states, involuntary responses and the focusing of our attention, or may concern objects of thinking. Experience teaches us that the mere suggestion *Don't be nervous!* can in fact intensify our anxiety, an attempt to calm us down such as *Don't cry!* can make us truly wail, and an appeal such as *Don't be angry!* can certainly get the adrenaline going. We are all aware of how this happens on the level of involuntary reactions, as the experience of being commanded to *Don't swallow now!* in the dentist's chair and the reaction that follows are rather common. The effect discussed here often manifests itself in relation to statements regarding the object of thinking or the focusing of one's attention. For example, anyone who hears "*Please don't pay any attention to your left hand or any feeling that you may have there*" may naturally (or even automatically) be more aware of the presence of his hand. This effect is clearly visible in the case of simple instructions, regarding the object of thinking: if you give someone the command *Don't think about a white bear!*, the automatic response will be to think about the beast immediately (in order to understand what we are supposed not to think about, we have to think about it first!). In fact, it turns out that a command of this kind may have an even longer-lasting effect, that is, it may cause the addressee to think about the object of the negated command more than once (Wegner, 1989).

It has been noted in the psychology of language and in social and pedagogical psychology that the use of negation may generate some counterproductive effects (Giora et al., 2007). In the traditional view, a negation sign is a kind of "instruction" from its sender to a listener to suppress the

negated information. It has been suggested that the marker of negation lowers the level of activation of the negated concept in comparison with an affirmation and makes it less accessible (McDonalds and Just, 1989). It is, however, clear now that suppression is not a sure thing. In certain conditions, the negated concept is activated and retains its mental representation (Kaup, 2001; Giora, 2006; Giora et al., 2005, 2007). This retention hypothesis is confirmed by research conducted into the priming paradigm. It turns out that the negation sign (*not-X*) does not reduce the priming influence of X on the target word; for example, the word *piercing* was primed both after *sharp* and after *not sharp* (Giora et al., 2005). A similar result was achieved with the use of the paradigm of affective priming (Deutsch et al., 2006, experiments 4 and 5). Observation of the effects of using negation in natural language suggests that the activation of a negated concept is likely to occur in the political context (Giora, 2007), or in the context of prohibitive signs (Giora et al., 2009).

The effects of using negations inconsistent with one's intention have also been discussed in the context of persuasive communication and attempts to hinder stereotypes. Persuasive attempts containing negation can have a paradoxical effect. For example, the message "*not difficult to use*" can prompt a judgment that is opposite to the one intended (Jung Grant et al., 2004). Training in negation of stereotypical content served to enhance both the automatic activation of stereotypical associations, as well as the intensification of automatic negative evaluations (Beukeboom, Finkenauer and Wigboldus, 2010).

Paradoxical effects of using negation are particularly clear in the case of negated directives. A distinctive example is the research conducted by D. Wegner, in which the issue of negations appears in the context of investigations into the mechanisms of mental control and the role of cognitive load in generating the failure of such control. According to Wegner's theory of ironic effects of thought suppression in cognitive load situations (dispersed attention), any effort at mental control, especially the wish to suppress certain mental states (i.e. a desire **not** to think about something or **not** to dwell on it at all), may lead to increased access to the suppressed content. In numerous experiments conducted by Wegner (Wegner and Wenzlaff, 1996), stronger paradoxical effects were registered when an instruction was of a negative character and stipulated **not** experiencing certain states (suppressing certain states) than when it was positive and commanded the concentration of one's thoughts on something. Suppression of thoughts can be treated as an equivalent of the negation mechanism; in the case of logical-corrective negation we are dealing with an operation of reversing meaning, while in the case of suppression the operation concerns volitional negation, such as "don't do something" (for example *Don't think about a white bear*). The Wegner team's experiments confirmed the occurrence of paradoxical effects in conditions of cognitive load in

such spheres as thinking, concentration, mood, relaxation and involuntary movements. For example, in research conducted by Wegner, Ansfield and Piloff (1998), one group of participants was asked to grasp a pendulum firmly and especially *not* to move it along the X-axis. The second group was also asked to grasp a pendulum firmly but without the additional instruction to avoid certain movements. In the mental-load context (solving an additional task), the pendulum moved along the X-axis more frequently in the case of the first group of participants, who had received the *Don't move along the X-axis* command, than in that of the group which was not told about the "forbidden" movement. Lane, Groisman and Ferreira (2006) worked with the paradox of negated commands in relation to revealing secret information. It turns out that an instruction not to reveal content (available only to the sender) regularly increased the number of "leaks". Possible trouble with realizing intentions embedded in negated commands has also been the subject of research into ignoring information (Schul and Manzury, 1990; Schul, 1993).

Negated directives in the context of attention focusing

The aim of the experiments described below was to examine the possible paradoxical impact of negated directives on attention focusing. Therefore, the experimental plan is linked to the idea of attention, the idea of explaining such phenomena as sensor selection as related to the cognitive system's limited ability to process several pieces of information at one time (see Necka, Orzechowski and Szymura, 2006, p. 186). Many aspects of selective attention are distinguished: a) information resource selection, b) searching of the perception area, c) prolonged concentration on a given type of objects, d) division of attention and e) attention shifting. The tasks used in the experiments described below refer to searching through the perception area and concentration on the given type of objects.

There is the widely-known phenomenon of paying attention to the object of a negated command, especially when it refers to kinaesthetic sensations within a particular part of the body (e.g. *Don't pay attention to your left hand, and particularly don't pay attention to its weight*). The thing that was not an object of the person's attention, which was not present in this person's stream of consciousness (for example the kinaesthetic sensibility of the left hand), suddenly appears in his or her consciousness following the suggestion not to pay attention. Parallel events take place here: the statement of the speaker and the potential presence (accessibility) of impressions occur at the same time. Being occupied by some activities we are not consciously paying attention to, we remain unaware of the experiences of our left hand. However, when we hear the command not to pay attention to this hand, its experiences automatically enter our thoughts.

In this paper I am interested in finding out whether a similar effect will occur when the negated order concerns an object inaccessible to its addressee's perception, and its exposition is only presaged in the command. The following sequence of events would then take place: 1) a negative command not to pay attention to something which is not yet accessible but is going to be, 2) the exposition of the object (among other stimuli) addressed in the key communication, 3) question testing if the main object was noticed. These elements are separated by breaks of several minutes in length.

I applied this sequence in a series of experiments. In the following experiments the key communicates affirmative and negative directives) were in written form. They referred to different objects and different indicators of attention focus taken. The consequences of using negative commands not to pay attention to some objects were checked, and a basic question was posed: could this kind of command could lead to paradoxical effects, i.e. the focusing of attention on information referred to by the omitted suggestion, and if so, was this is an automatic effect?

Experiment 1

Participants

Eighty people took part in the experiment: 44 female and 36 male students of the Institute of Journalism at the Jagiellonian University in Cracow (average age $M = 21.37$, $SD = 1.6$), randomly selected and assigned to four groups (20 people in each). Participation in the experiment was voluntary and unpaid.

Materials and procedure

We used a fragment (26 pictures) of the children's comic 'Emperor Smith' from the popular series 'Lucky Luke' (the title of the series comes from the first name of the main character). There is a 'villain' among other the characters that will be referred to as the 'gangster' in the following part of this paper. The participants were asked to read a selected part of the comic after being given an introductory text including the key communicates related to one character - the gangster. Four versions of this communicate were prepared. The control group text read as follows:

The comic, part of which you are going to read, presents stories from the main character's life. Many different characters appear, and there are sudden plot twists and unusual adventures full of humour. Enjoy the read!

Three other groups were given the same text with an additional communicate preceding the last sentence. Control Group No. 2 received the text with a sentence on the gangster which was neither a directive nor an order: *There are many characters, one of which is the gangster.*

Group No. 3 received a direct order, with the text containing the sentence: *There are many characters, but pay special attention to the gangster.*

Group No. 4, the one receiving a negative command, received the text with the following sentence: *There are many characters, so don't pay attention to the gangster.*

Four groups took part in the experiment: there was no mention of the gangster in the introductory text of the comic for Group No. 1 (Control Group No. 1), there was mention of the gangster in the introduction for Group No. 2 but without any order (Control Group No. 2), participants in Group No. 3 received a direct order to pay attention to the gangster, and the introduction for Group No. 4 contained an order **not** to pay attention to the gangster.

After reading the fragment of the comic given (the average reading time was 1 min. 57 sec., $SD=30,4$ sec. and there were no differences between the groups; $F(3,76)=0.75$, $p=0.57$), the participant was given the unexpected task of answering 10 questions about some details of the comic. Five questions concerned the gangster (these questions are referred to as 'key questions' in the following analysis), and five others concerned different details of the comic (these questions are referred to as 'control questions'). The questions were printed in advance on a piece of paper, and participants had to answer in writing.

In both the key questions and the control questions there were three questions concerning the picture itself, and two questions connected with the characters' dialogue in the speech bubbles. Two of the questions about visual details were closed questions (participants had four answers to choose from), and one was open response. Questions concerning the semantic, verbal aspects of the comic were open response. The control questions were arranged in a similar manner: three questions concerned pictures (two closed questions and one open response), while two questions were connected with verbal aspects of the comic (open response questions concerning characters' dialogue). Subjects and details of the comic were chosen on the basis of a pilot study. Too difficult or too easy questions were omitted, i.e. questions answered correctly by most of the participants or questions that a majority was unable to answer. Special attention was paid to the fact that there should be no difference in the level of difficulty between the key questions (concerning the gangster) and the control questions (concerning other details of the comic). The pilot study encompassed two stages and involved 30 individuals. First, 43 objects were verified and those that did not fulfil the given conditions were rejected. Next, on the basis of a second pilot study, 10 details were chosen which became the subjects of the key and control questions. The key and control questions were presented alternately on the paper.

Tested variables and expectations.

The main research question was whether negative directives related to a particular comic character would – paradoxically – increase attention to that character compared to controls groups. The independent variable was the kind of statement included in the introductory text (4 levels). The

dependent variable was attention focus, which was measured by the correctness of the answers to the questions on details of the comic. The indicators of the influence of the kinds of communicates used on attention focus were frequency of the recall of 'gangster' details compared between the groups of participants, and a comparison of this result with the frequency of recall of details having nothing in common with the gangster.

The idea for creating Control Group No. 2 (in which the gangster was mentioned in the introductory text) came from the desire to control for the possible factor of expected results. If, according to expectations, the group receiving the negated order gave a higher level of correct answers to key questions than the control group, this could be explained not by the paradox of negated commands but by the fact that the gangster was specifically mentioned to them, leading to greater accessibility in memory of details concerning this character. Control Group No. 2 was included in order to control for this possibility.

The instructions for Group No. 3 included a direct order to pay attention to one of the comic's characters, so it was obvious to expect a higher level of correct answers to the key questions in that group in comparison with answers to key questions in the control groups. The most interesting result concerns the group which received the negative order (Group No. 4). It was assumed that the paradoxes of negated commands described in the literature and observed in everyday communication would reveal themselves in the task of recollecting the comic's details, that the participants would answer the questions concerning the gangster better than the questions on the events in the comic, and also that their recall of details on the key characters would be greater than in the control group. Those differences should not appear if the negative order was understood in accordance with the explicit intention included in the command (not to pay attention to the gangster). Proof of the paradox of negative orders is also found in the lack of differences among the tested indicators in comparison with the group receiving the direct order. It was expected that Control Group No. 2, where the gangster was mentioned without an order to focus attention on him, would display no differences in respect of the indicators we are interested in compared to Control Group No. 1, and that Group No. 2 would have a considerably lower indicator of attention focus than the group receiving the negative order. The results for Control Group No. 2 would thus be: first, proof that the assumed attention focus on the given object in the group with the negative order results not only from mention of the object in the instruction, but also from the imperative mood; second, that it would be additional confirmation of the assumption of the paradoxical character of the impact of negative orders concerning attention focus.

Results

From the point of view of the research problem, we are interested in an inter-group comparison of the answers to

key questions (concerning the gangster) and confrontation of the results for the key questions with the results of the control questions within groups.

We performed a mixed-model analysis of variance (ANOVA) with two factors. The experiment consisted of four (kind of group; kind of communicate included in the introduction to the comic) \times 2 (kind of questions: key questions - concerning the gangster vs. control questions - connected with other details not concerning that character). The main effect of the kind of group appeared as $F(3, 76) = 4.55$, $p < 0.01$; $\eta^2 = 0.15$. The experimental groups (direct order and negative order) did not differ in the level of correct answers to all of the questions (without the division into key and control questions) concerning the part of the text that was read ($F(1, 76) = 0.77$; $p = 0.38$), and there were no significant differences between the two control groups ($F(1, 76) = 1.52$; $p = 0.22$). Differences, however, did appear when we compare the experimental groups with the control groups. It turned out that the group with the negative order gave a significantly higher level of correct answers than Control Group No. 1, ($F(1, 76) = 11.85$; $p < 0.001$, $\eta^2 = 0.13$) as well as Control Group No. 2, ($F(1, 76) = 4.87$; $p < 0.05$, $\eta^2 = 0.06$). In addition, the group receiving the direct order gave a significantly higher number of correct answers than Control Group No. 1 ($F(1, 76) = 6.55$; $p < 0.05$; $\eta^2 = 0.07$), but in comparison with Control Group No. 2 this difference was not statistically significant; ($F(1, 76) = 1.75$; $p = 0.18$).

In addition, there was also the main effect of the kind of questions ($F(1, 76) = 48.93$; $p < 0.001$, $\eta^2 = 0.39$); it was easy to foresee that the subjects would recall significantly more details associated with the key questions than with the control questions. This was not the case in every tested group; the kind of group and the type of questions (key and control questions) revealed a significant interaction; $F(3, 76) = 22.052$, $p < 0.001$, $\eta^2 = 0.46$, which means that the correctness of the answers to key questions changed depending on the kind of group (Fig. 1).

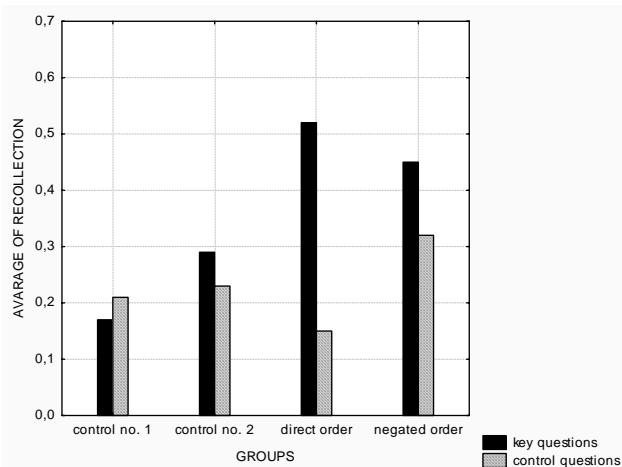


Figure 1. The average of correct answers to the questions concerning the comic; the kind of group interaction and the type of question effect.

In Control Group No. 1 the correctness of the answers to key questions and control questions was at the same level ($F(1, 76) = 1.15$; $p = 0.28$). Control Group No. 2 had similar results ($F(1, 76) = 2.60$; $p = 0.11$). However, the order **not** to pay attention to the gangster generated the paradoxical result that, in this group, details concerning the gangster were recalled significantly more often than the other details included in the control questions $F(1, 76) = 12.23$; $p < 0.001$, $\eta^2 = 0.13$. This difference was most visible in the group receiving the direct order; the results for the key questions were significantly higher than for the control questions; $F(1, 76) = 99.08$; $p < 0.001$, $\eta^2 = 0.56$.

Making an inter-group comparison only for the key questions, we also obtained answers to the main group effect: $F(3, 76) = 12.11$, $p < 0.001$, $\eta^2 = 0.32$. In the group receiving the negative order, the level of correct answers to questions concerning the gangster was significantly higher than in Control Group No. 1 ($F(1, 76) = 19.08$; $p < 0.001$, $\eta^2 = 0.20$), and higher than the result of Control Group No. 2 ($F(1, 76) = 6.23$, $p < 0.05$, $\eta^2 = 0.07$).

As assumed, the direct order had a clear impact on noticing and recollecting different details concerning the gangster. Proof of this is found in the size of the difference with Control Group No. 1 ($F(1, 76) = 29.82$; $p < .001$, $\eta^2 = 0.28$) and Control Group No. 2 ($F(1, 76) = 12.87$; $p < 0.001$, $\eta^2 = 0.14$). However, it turned out that the negative order **not** to pay attention to the gangster also placed this character at the centre of attention, and to a similar extent as in the group whose participants were told to pay attention to this character.

The group to which the gangster was made mention of before reading the comic (Control Group No. 2) had better results for the key questions than Control Group No. 1; the difference bordered on statistical significance: $F(1, 76) = 3.50$; $p = 0.065$. Thus, it may be concluded that the mention of the key character did direct the participants attention to some extent, but to a less extent than the direct order and the negative order.

Finally, an inter-group comparison of answers to control questions was performed. An interesting question arose of whether the kind of communicate included in the introductory text had an influence on the correctness of answers to such questions. It turned out that the group receiving the direct order (having the greatest number of correct answers to key questions) answered the control questions significantly worse than the group with the negative order; $F(1, 76) = 7.83$; $p < 0.01$, $\eta^2 = 0.09$. This group also had a significantly lower number of correct answers in comparison with the combined result for the other groups; $F(1, 76) = 4.34$; $p < 0.05$; $\eta^2 = 0.05$. This proves that the order to pay attention to a particular object led to less careful registration of other details in the comic. The other inter-group comparisons concerning the control question results did not show any statistically important differences.

Discussion

In this study we intended to test the impact of variously formulated instructions on attention focusing. Two kinds of questions were examined by means of checking the number of details recalled concerning part of the comic (and, consequently, the participants' attention focus). First, so-called key questions concerning different details connected with the gangster, and second, control questions concerning other details of the comic. Results from the two control groups proved that there was no difference in the difficulty level in answering questions from these two categories: participants gave a similar number of correct answers to the key questions and the control questions. Reading the comic following an order to pay attention to the gangster resulted - obviously - in paying greater attention to this character than to any other element of the comic. A similar effect, however, was obtained for the negative order group; here too the key questions were answered significantly better than the control questions. This result shows that the order **not** to pay attention to the gangster paradoxically drew greater attention to this character. This conclusion is supported by the inter-group comparison of answers to key questions, as the group receiving the negated order gave a significantly higher level of correct answers in comparison with Control Group No. 1 and No. 2. The last group received mention of the gangster in the introductory text but not as a directive, i.e. without any suggestion to pay attention to this character. This proves that we can dismiss the supposition that specifically directing the comprehenders' attention to the gangster resulted in greater accessibility of this character following its having been previously pointed out rather than from the paradoxical effect of the negated orders. This paradox is confirmed by the fact that the group receiving the negated order gave a similar number of correct answers to key questions as did the group receiving the direct order. It should be emphasised that for the group with the negative order, the task of recollecting the gangster's details was not collated with the suggestion not to pay attention to him included in the introductory text, which might have led to the kind of discord connected with the task of carrying out the researcher's instructions. This means that the level of attention focused on the gangster could have actually been greater in this group, as is demonstrated by the number of correct answers.

Interesting results are also to be found in the answers to the control questions. The number of correct answers among them may serve as an index of a more or less controlled process of paying attention to the character of the gangster (when intentionally paying attention, other details are overlooked more easily). The group receiving the direct order gave a significantly lower number of correct answers to the control questions than the group with the negative order. Undoubtedly, this was the price for controlled paying of attention to the gangster, which resulted in a less-careful registering of other details of the comic. Such costs were not

borne by the group with the negative order; the correctness of their answers to questions regarding details of the comic other than the gangster was even greater than in the two control groups. Thus, in Group No. 4, details of the gangster were noticed not because of the control questions, but rather because of unintentional paying of attention, which allows us to draw conclusions about the automatic character of the described paradox of negative orders.

Further experiments were designed to check the validity of the aforementioned suppositions. Their aim was - by the choice of additional indicators of attention focus - to check the hypothesis of the automatic process of attention focus with negative orders.

Experiment 2

The inspiration for this experiment design was the Stroop task, which concerns testing the attention and interference process of the original design (Stroop, 1935). In the classical version this task consists in the fastest possible naming of the colour of the font of words denoting different colours. The words' font either matches the colour named (e.g. 'red' is written in red) or does not match it (e.g. 'red' written in green). The control stimulus is a nonsensical sequence of letters, e.g. XXX. The Stroop test concerns the conflict between the more controlled action of naming the colour of the ink and the more automatic action of comprehending the content of the word. The indicator of this conflict of two actions is the loss of speed when naming the colour of the ink in comparison with the time needed for naming the colour of the control stimuli. The findings of numerous investigations unambiguously show that interference occurs when the font colour differs from the meaning of the word (comp. MacLeod, 1991); it takes more time for subjects to name a mismatched colour than a matching colour or the colour of geometrical figures or a random sequence of letters. The emotional Stroop test is based on the assumption that the content of some words may automatically grab the subject's attention. Words having emotional meaning for participants draw greater attention than neutral words. The interaction effect has been observed in connection with emotional disorders (Mogg, Mathews and Eysenck, 1993), participants' personal interests (Daggleish, 1995), and criteria of others people's evaluations important to the participants (Sędek and Krejtz, 2001).

It can be assumed (according to previous application of the Stroop task), that the time needed to name the colour of the word is the indirect indicator of the degree of concentration on comprehending the meaning of the word. This is where the author's idea to test the impact of the order of interpretation on the attention focus in the colour naming task using the interference of the font colour and the word content comes from. It was assumed that if the meaning of the presented words, under the influence of an appropriately formulated order (a direct order or negated one), draws the

participant's attention, the response time would be longer in comparison with the control conditions. The question was asked if the differently formulated orders (direct and indirect), increase attention focus when measured by the time needed to name the colours of the words, and also by the level of their later recollection. For this purpose, a task consisting in naming the colours of words (names common in various nations) was used, in which response time served as the indicator of interference arising out of an order included in the instruction (an order to pay/not to pay attention to names typical for a given nation). Additionally, the number of correct recollections of the names presented names was recorded as the indicator of attention focus.

Participants

Eighty seven students of psychology took part in the experiment, 76 women and 11 men (the average age $M = 19.5$, $SD = 1.1$). Participants were randomly selected from among students in university courses chosen to take part in the experiment, then assigned to four experimental groups.

In Control Group No. 1 there were 21 people (1 man); in Control Group No. 2, where the key nation was mentioned but without an order, there were 21 people (1 man); there were 23 people (4 men) in Group No.3 receiving a direct order, and there were 22 people (5 men) in the group receiving a negative order. Participation was voluntary and unpaid.

Procedure and equipment

The experiment was carried out in the computer room of the Institute of Practical Psychology of the Jagiellonian University using personal computers with the following configuration: Intel Celeron 1.11 GHz processor, Panasonic 17" monitors, screen resolution 1024x768 pixels, screen refresh rate 75 Hz. The experiment was carried out simultaneously at four computer terminals connected to the local network with a central unit which collected the results. In the large computer room only four remote terminals were present to eliminate the potential influence of other people doing the task. Every instruction and task (experimental stimuli) appeared on the monitor screen, and the experimenter (the author of this paper) ensured the course of the experiment was consistent with the procedure (*Lucida Console* font was used, instructions were written in size 12 font and the stimuli appeared in size 36 font in the middle of the monitor).

A specially-designed computer program compatible with Windows 2003 was used in the experiment. The first part contained sentences constructed in accordance with the classic Stroop test: naming (by pressing the right key) the font colour (red, green, brown and blue), which either matched or mismatched the content of the word. This was a training sequence for participants to understand the nature of the task and to learn how to press four keys with

selected fingers without looking at the keyboard. The second part contained the actual experimental task. In the middle of the screen a series of 14 names written in red, green, blue or brown font appeared, and the participants named the font colour by pressing the right key. The program measured the response time for the font colour: from the moment of the word's appearance of the word until the key was pressed (the stimulus exposition lasted until the participant's reaction occurred). The response time for the two first words in the series was omitted; in tests using response time, such as IAT, it is supposed that responses to the two first stimuli are the transition between reading the instructions and doing the task, thus the participant is not sufficiently focused on doing the task (comp. Maison, 2004). Only the correct response times were registered, which is why the statistical calculations do not include erroneous response times. To verify proper distinction of colours and absence of vision defects among participants, the lower limit of acceptable errors was established at 20%. A false response was indicated by the word 'Mistake' on the screen. Response times shorter than 200 ms and longer than 2000 ms were adjusted by reducing them to 200 ms and 2000 ms respectively. The test consisted of three stages. The first stage (approx. 5 minutes) was for training, during which participants had to distinguish colours. During the first training session, the letters 'XXXXX' in different font colours appeared, and during the second one the names of four colours appeared in black font. In the third series, the font colour matched the content of the word and in the fourth one the name of the colour mismatched the font colour. Every series contained 10 stimuli. Response times in the training session allow us to state that there were no differences between the groups in response times for presented colours.

The second stage (approx. approx. 3 minutes) was the main experimental task consisting of naming the colour of the names of people from different countries. The experimental series was preceded by the following instructions: *In this part you are going to see a number of words in different font colours presented one by one. The colours are: green, red, blue and brown. Press the key Z for green (zielony), C for red (czerwony), N for blue (niebieski), B for brown (brązowy) as quickly as possible. The words which are going to appear on the screen are the names of people from different countries. Remember to react as quickly and precisely as possible.*

The aforementioned instructions were used in the control group (Group No. 1). Control Group No. 2 received the same instructions with an additional piece of information, namely, that among the names there would be some Jewish ones. The key communicate for Group No. 2 was: *The words that are going to appear on the screen are names of people of different nationalities, for example Jewish names.* The key communicate for the Group No.3 included a direct order: *While*

doing this task, **pay attention to the Jewish names that appear on the screen**. Remember to react as quickly and precisely as possible, but pay attention to the Jewish names.

Group No.4 received a negative order: *While doing this task, do not pay attention to the Jewish names that are going to appear on the screen*. Remember to react as quickly and precisely as possible, but do not pay attention to the Jewish names.

On the basis of the introductory test concerning the association of names with the given nation, the following names were chosen: Isaac and Moshe (Jewish), Hans and Helmut (German), Jean and Pierre (French), John and Bill (American), Boris and Igor (Russian), Sven and Olaf (Swedish). There were also two other names used (Jan and Marek) that began the experimental series and were not taken into account when measuring response times nor in the task of names recollection. On the computer screen the following names appeared: Jan (blue), Marek (red), Boris (green), Isaac (red), Bill (blue), Hans (red), Moshe (blue), Helmut (brown), Pierre (brown), Olaf (green), Jean (blue), Igor (brown), Sven (green), John (red). The first two names were not taken into consideration, thus the measurement of response times concerned 12 names. The key names were Isaac and Moshe, and the comparative ones were Bill and Hans – in the same two colours. The order of exposition was balanced by putting the key names in positions four and seven and the comparative ones in positions five and six.

The third stage of the experiment was the task of names recollection: after the colour naming task the participants unexpectedly received the task of writing down on the supplied piece of paper every name they could remember after the experimental session (approx. 2 minutes).

Tested variables and expectations

There were two indicators of attention focus taken: time needed for stating the colour of the names, and recollection of those names after doing the task. The first indicator was the time needed for naming the colour of the two key names (Isaac and Moshe) and two comparative names (Bill and Hans). The question was asked if the negative order and the direct order connected with Jewish names would cause interference in the task involving giving the names of colours in comparison with the comparative naming of names colours task and the control groups task. Independently of accepting two names to be compared with the key names, the decision was taken to register the times for naming of all the names' colours with the exception of the first two in the series.

The second indicator of attention focus was frequency of key names recollection in comparison with other names. It was asked if the negated order and the direct order connected with Jewish names would impact the level of recollection of those names in comparison with the other names

of the experimental series, as well as in comparison with recollection of names in the control group.

Just as we automatically notice the “redness” of a red rose when we look at it (with the exception of certain perceptual abnormalities), we automatically read a written word when it is in front of our eyes. And so, when faced with the task of defining the colours of words in a Stroop test, we find it impossible not to notice the meaning of these words, as shown by the results of the classic Stroop test. For interference to occur, meaning the elongation of the response time during an incongruence task (incongruence of the meaning of the word with its colour, for example the word “red” is written in blue) participants have to notice the meaning of the written word, independently of its consistency with the colour. The longer response time in inconsistent cases is the effect not so much of focusing longer on the displayed word (inconsistencies attract more attention) but taking more time to decide which key to press because of the conflict between the meaning of the word and its visual display.

However, I have found no such inconsistencies in my own research; in other words, no delayed reaction could be the result of a conflict between the semantic aspect and perceptual data. It is therefore fair to assume that the length of a delayed response may be interpreted in terms of a more or less controlled focusing of attention on the verbal stimuli. The direct command included in the instruction, i.e. to focus attention on the names of a given nationality, probably sets in motion a more controlled process of capturing the meaning of the words displayed. It is then easier to anticipate that in the group which received a direct command, the time for defining colours would be slower, and the rate of recalling the key names would be higher than in control groups.

An important result was observed in the case of the group given a negated command: a delayed time for defining colours in group 4 in relation to the control group would lead us towards the paradox of negated commands, i.e. it would be an indicator of increased focusing of attention on the meaning of the presented words; however, such results would not help us decide if the focusing is controlled, as it was in the group receiving the direct command, or rather automatic. On the other hand, the fact that there was no difference in the task of naming colours between the variable and control groups would indicate that a negated command does not result in a controlled (intentional) focusing of attention on the semantic aspect of the presented words. The results of the memory test were supposed to check if such a command enhances the automatic character of reading verbal stimuli. The automatic focusing of attention could be concluded if the times for defining the colours of the key and comparative names in that group were the same as in the control groups, and at the same in the “negated” group the recall of key names was better than of comparative names and better than in the control groups.

Results

Colour naming time

We performed a mixed-model analysis of variance (ANOVA) with two factors: 4 (Communicate Type: no order vs. Jewish names mention vs. direct order vs. negative order) \times 2 (Names: key names vs. comparative names). The first factor was the cross-object factor, the second was the in-object one.

The main effect of the Communicate Type appeared: $F(3, 61) = 2.62$; $p = 0.058$; $\eta^2 = 0.11$. The longest 4 names naming time occurred in the group receiving the direct order ($M = 1238$ ms; $SD = 350$). This effect resulted mainly from the difference in response times between the group having the direct order and Group No. 2, ($M = 1005$ ms; $SD = 228$), $F(1, 61) = 7.36$; $p < 0.01$; $\eta^2 = 0.10$. The average result of the group with the direct order differed significantly from the combined results of the three remaining groups, $F(1, 61) = 6.68$; $p < 0.05$; $\eta^2 = 0.09$.

It should be mentioned that a similar pattern of results was obtained with all the names included in the analysis (i.e. all colours used), $F(3, 44) = 3.1488$; $p < 0.05$; $\eta^2 = 0.17$. The group with the direct order ($M = 1136$ ms; $SD = 428$) named the colours slower than the other three groups, but a statistically significant difference occurred only in comparison with Group No. 2 ($M = 889$, $SD = 276$), $F(1, 44) = 8.19$; $p < 0.01$; $\eta^2 = 0.15$. In addition, in the case of all names the average response time in the group receiving the direct order differed significantly from the combined results of the other three groups, $F(1, 44) = 8.04$; $p < 0.01$; $\eta^2 = 0.16$.

There was neither a main effect of the Name Marked, $F(1, 61) = 0.21$; $p = 0.64$ (for Jewish names $M = 1120$ ms; $SD = 314$, for comparative names $M = 1095$ ms; $SD = 312$) nor an interaction of the Name and the Kind of the Communicate, $F(3, 61) = 0.69$; $p = 0.55$, so there were not any differences between response times for the Jewish names and the comparative names within a given group. Thus the direct order lengthened the response times in the case of key names as well as of the comparative names. However,

there were no significant differences in response times between the group receiving the negative order and the control group.

Name recollection

For the participants, the results of a given nationality names recollection could take three different values: no recollection, recollection of one name, recollection of two names. The basic issue explored was if the recollection of Jewish names would be easier in the experimental groups than in the control ones and if those names would be recalled more often than the other nations' names. A comparison was performed of the average results for recollection of the names typical for a given nation in the four groups (Table 1).

It was expected that the kind of the communicate included in the order would influence the result of Jewish names recollection. It occurred that the Jewish names were recalled significantly more often in both of the experimental groups than in the control group. However, there were no significant differences in key names recollection noticed between the group receiving the direct order and the group with the negated order, $\chi^2 = 0.76$; $df = 1$; $p = 0.38$. It turned out that the negative order concerning attention focus may generate paradoxical effects; this conclusion is confirmed by the lack of inter-group differences concerning all other nations besides Swedish. In this case of Sweden, differences were generated by a surely accidental lack of recollection in Group No. 2).

An interesting result occurred in Group No. 2 in which (as opposed to other experimental groups) there was no significant facilitation effect in recollection of key nation names observed in comparison with the Control Group 1, $\chi^2 = 1.43$; $df = 1$; $p = 0.23$. This means that the mention of the nation included in the instructions had a smaller impact on attention than the orders (direct as well as indirect). Nevertheless, the impact of the key nation mention caused the level of recollection in this group to be insignificantly lower than in the groups receiving the direct order and negative order (respectively: $\chi^2 = 1.55$; $df = 1$; $p = 0.21$ and $\chi^2 = 0.17$; $df = 1$; $p = 0.67$). Lastly, a comparison was made

Table 1. Recollection frequency of names from different nations comparison for the four groups ($df = 1$). Experiment 2.

Nations	Gr. 1 %	Gr. 2 %	Gr. 3 %	Gr. 4 %	Gr. 1/2 Chi ²	Gr. 1/3 Chi ²	Gr. 1/4 Chi ²	Gr. 2/3 Chi ²	Gr. 2/4 Chi ²	Gr. 3/4 Chi ²
Jewish	21.7	38.9	58.3	45.5	1.43	6.53**	2.84*	1.55	0.75	0.76
German	34.8	33.3	20.8	27.3	0.009	1.14	0.29	0.83	0.17	0.26
French	21.7	11.1	25.0	4.5	0.80	0.07	2.87	1.28	0.61	3.72
American	21.7	5.6	25.0	18.2	2.11	0.07	0.09	2.80	1.44	0.31
Russians	17.4	16.7	16.7	18.2	0.004	0.004	0.005	0.00	0.01	0.01
Swedish	26.1	0.0	41.7	9.1	5.50*	1.27	2.22	9.80**	1.72	6.3*

* $p < 0.05$; ** $p < 0.01$

Table 2. Comparison of the key nation (Jewish) names recollection with the other nations names in the four tested groups. For all the comparisons $df = 1$. Experiment 2.

Nations	Group 1	Group 2	Group 3	Group 4
German	$p = 0.54$	$p = 1.0$	$p = \mathbf{0.012}$	$p = 0.34$
French	$p = 1.0$	$p = 0.12$	$p = \mathbf{0.021}$	$p = \mathbf{0.012}$
American	$p = 1.0$	$p = 0.70$	$p = \mathbf{0.039}$	$p = \mathbf{0.031}$
Russian	$p = 1.0$	$p = 0.34$	$p = \mathbf{0.013}$	$p = \mathbf{0.031}$
Swedish	$p = 1.0$	$p = 0.07$	$p = 0.42$	$p = \mathbf{0.039}$

between the frequency of the key nation names recollection with the other nations names recollection in the tested group (Table 2).

It turned out that in Group No. 1, Jewish names were recalled as often as all the other nations' names. Also, in Group No. 2 the results of Jewish names recollection (although generally higher) did not differ significantly from the results for all the other nations. In Group No. 3 (the direct order) they were recalled significantly more often than any other except Swedish. Similarly, in the group receiving the negative order for only one nation (German), the better recollection of the Jewish names was below the level of statistical significance.

Discussion

The colours of the given nations naming time was to be one of the indicators of experimental manipulation, understood as using a direct order and a negated order in the instructions. It also turned out that in the group which received negated commands, the time needed for defining colours of words was identical to that in the control groups, which means that the negated command **did not** lead the researched group to intentionally focus more attention on the content of the words presented to them. In respect of the experimental task, the semantic encoding in the control groups was completely unnecessary, but for Group No. 3 (the direct order) the instructions implied the semantic encoding by the suggestion to pay attention to the names of the given nation. Thus, in line with the presumption participants in the group receiving the direct order reacted more slowly during the colour naming task. However, in this group (as well as in the other ones) there was no difference in response times between the key names and the comparative ones. This result allows us to draw the conclusion that the direct order included in the instructions results in all the names, not only the Jewish ones which the order concerned, drawing more attention. As a result, response times in colour naming are delayed. This result is consistent with the presumption made in the discussion of Experiment 1 results that a direct order starts the controlled process of attention focusing and stimuli encoding.

The results of the memory test are consistent with the results of Experiment 1; in the group with the direct order, as well as in the group with the negative order, the key nation names recall was significantly better than almost all other nations' names. However, in both control groups the level of the Jewish names recall did not differ from the results for the other nations.

Using one more control group allowed us to test the possibility that better recollection of the key names in the group receiving the negative order would not induce the negative orders paradox, i.e. automatic attention focus on the words that were not supposed to be the object of attention. We attempted to examine other interpretations, for example that mention of the Jewish names made in the instructions could make them more available, or that participants recalled the content of the instructions during the memory test, which made recalling the names easier. A better key names recollection result was obtained by the group receiving the direct order and the group receiving the negative order (Groups No. 3 & 4) than in the control group (Group No. 1). This could be evidence of the negative order's impact on attention focus concerning word content. However, in Group No. 2 (receiving no order but Jewish names were mentioned in the instructions) the key names were recalled more often than in Group No. 1, yet the difference was not statistically significant. On the basis of results from Group No. 2, we can suppose that the direct cause of the facilitation effect in key names recollection is the automatic process of focusing on word content during colour naming, and the indirect cause is the controlled process of inference from the instruction.

Referring to the key issue of the impact of using negative orders on attention focus, we can suppose that both of the mechanisms described above were involved. While only the mention of Jewish names in the instructions did not cause a statistically significant difference of recollection in both of the control groups, the negative order affected the level of recollection significantly. Using the mention in Group No. 2 made key names recollection so easy that there were no statistically significant differences in the results between this group and the group receiving the negative order.

It should be kept in mind that the presence of four colours and the necessity of operating that the same number of keys was connected with a significant cognitive burden. The question arises of whether engaging the cognitive resources of the participants in operating the keys could have weakened the impact of the experimental manipulation (the differently formulated instructions). Thus, we may ask if reduction of the number of colours to two, requiring fewer cognitive resources engaged in controlling of the keys, increase the impact of the order included in the instructions? This question was the inspiration for the design and performance of the third experiment.

Experiment 3

Participants

Eighty five students in their 2nd and 3rd years of study at the Faculty of Management and Social Communication took part in the experiment (73 women and 12 men, average age $M = 21.31$, $SD = 1.7$). They were randomly selected and assigned to four groups as in the previous experiment. There were 22 people in three of the groups, and 19 people in Control Group No. 2.

Materials and procedure

The procedure was identical to that in the previous experiments. The only difference was that two colours were used (red and blue), and the name "David" instead of "Moshe" (in the preceding test the name was equally often indicated).

The following names appeared on the computer screen: Jan (red), Mark (blue), Isaac (blue), Bill (blue), John (red), David (red), Helmut (blue), Pierre (red), Olaf (red), Jean (red), Igor (blue), Sven (blue), Hans (red), Boris (blue). The two first names were treated as the practice stimuli, so response times and their recollection were not measured. Two key words that the experimental manipulation concerned were Isaac and David, and the two comparative names were John and Bill. Rotation of the exposition order was applied: in half of the cases the key names were in the third and the sixth positions in the list with the comparative in the fourth and fifth positions, and in the others this was reversed.

Results

Colour naming time

At the beginning, reaction times to the two key names (Isaac and David) and the neighbouring comparative names (John and Bill) were analyzed. It is worth mentioning that in the case of names from the same nation (including Isaac and David) colours naming time was similar. The analysis of the variable in the scheme: 4 (Kind of the Communicate: No Order vs. Direct Order vs. Negative Order vs. Jewish Names Mention) \times 2 (the Name: Key vs. Comparative)

elicited the main effect of the Kind of the Communicate $F(3, 81) = 20.94$; $p < 0.001$; $\eta^2 = 0.43$. In the group receiving the direct order (Group 3), reaction times ($M = 865$ ms; $SD = 273$) were longer than in the other groups: $F(1, 81) = 60.67$; $p < 0.001$; $\eta^2 = 0.42$. The other groups' reaction times did not differ from one another.

It should be mentioned that exactly the same pattern of results appeared when only the reaction times to the Jewish names were taken into consideration ($F(3, 80) = 13.03$; $p < 0.001$; $\eta^2 = 0.32$) and when reaction times to all names were taken into consideration ($F(3, 62) = 24.22$; $p < 0.001$; $\eta^2 = 0.53$). Also in the cases the colours naming time in the group having the direct order was significantly longer than in every other group of comparable results.

The main effect of name was as such: $F(1, 81) = 5.26$; $p < 0.05$; $\eta^2 = 0.061$. The colours of the two Jewish names ($M = 619$ ms; $SD = 311$) were named more slowly than the two comparative names ($M = 561$ ms, $SD = 228$), which mainly affected the results obtained in Group No.3 (discussed below). Taking the names from all the nations into consideration gave an analogical result: $F(5, 315) = 8.11$; $p < 0.001$; $\eta^2 = 0.12$, and analysis of the contrasts revealed a statistically significant difference between the naming time for Jewish names and the colours naming time for all the other nations names: $F(1, 63) = 17.25$; $p < 0.001$; $\eta^2 = 0.21$.

What was the relation between the key names and the comparative ones in individual groups? There was no significant interaction between the Kind of the Communicate and the Name, $F(3, 81) = 0.98$, $p = 0.40$. Analysis of the contrast showed a statistically significant difference in reaction times only in the group receiving the direct order, $F(1, 81) = 5.02$; $p < 0.05$; $\eta^2 = 0.05$; Jewish names colours ($M = 919$ ms; $SD = 322$) were named more slowly than the comparative names colours ($M = 812$ ms, $SD = 287$).

In the group receiving the negative order the Jewish names colours ($M = 557$ ms, $SD = 243$) were also named more slowly than comparative names colours ($M = 478$ ms, $SD = 218$), but this difference did not reach statistical significance $F(1, 81) = 2.76$; $p = 0.10$. In the other groups, reaction times were almost identical.

Name recall

The average number of recalled names in the four experimental groups was calculated, excluding Polish names which generated a familiarity effect. Next, as in Experiment 2, on the basis of the average results for every nation the levels of those nations names recall across the four groups were compared. The results of this comparison is shown in Table 3 below.

Exactly the same pattern of results obtained as in Experiment 2 appeared: Jewish names in both of the experimental groups were recalled significantly more often than

Table 3. Comparison of the frequency of particular nations names recall in the four groups.(df = 1). Experiment 3.

Nations	Gr. 1 %	Gr. 2 %	Gr. 3 %	Gr. 4 %	Gr. 1/2 Chi ²	Gr. 1/3 Chi ²	Gr. 1/4 Chi ²	Gr. 2/3 Chi ²	Gr. 2/4 Chi ²	Gr. 3/4 Chi ²
Jewish	25.0	47.4	86.4	63.6	2.11	16.10***	6.31**	7.15**	1.09	3.03
German	35.0	26.3	45.5	31.8	0.34	0.47	0.48	1.61	0.14	0.86
French	20.0	5.3	18.2	9.1	1.89	0.02	1.01	1.58	0.22	0.77
American	15.0	26.3	40.9	27.3	0.76	3.44	0.93;	0.96	0.00	0.91
Russian	30.0	21.1	13.6	13.6	0.40	1.66	1.66	0.39	0.39	0.00
Swedish	30.0	21.1	27.3	31.0	0.49	0.038	0.01	0.21	0.60	0.10

p < 0.01; *p < 0.001

Table 4. Comparison of recall frequency of key nation names (Jewish) and the other nations names in the four groups. Experiment 3.

Names in the stimulating series	Group 1	Group 2	Group 3 (having the direct order)	Group 4 (having the negative order)
German	$p = 0.72$	$p = 0.42$	$p = \mathbf{0.035}$	$p = \mathbf{0.032}$
French	$p = 1.0$	$p = \mathbf{0.021}$	$p = \mathbf{0.000}$	$p = \mathbf{0.002}$
American	$p = 0.68$	$p = 0.38$	$p = \mathbf{0.013}$	$p = \mathbf{0.057}$
Russian	$p = 1.0$	$p = 0.22$	$p = \mathbf{0.000}$	$p = \mathbf{0.007}$
Swedish	$p = 1.0$	$p = 0.26$	$p = \mathbf{0.001}$	$p = \mathbf{0.092}$

in the control group (Group No. 1), while the names of the other nations were recalled equally often in both of the control groups. In the group with the direct order the Jewish names were recalled more often than in the group receiving the negative order, but this difference did not reach statistical significance, $\chi^2(1) = 3.03$; $p = 0.08$. Once again, a result demonstrating that the direct order and the negative order significantly increase the level of key names recall was obtained. In Control Group No. 2 the Jewish names were recalled more often than in Group No. 1, but this difference was not significant, $\chi^2(1) = 2.11$; $p = 0.14$. Those two groups did not differ in the level of recall of the other nations' names. In Control Group No. 2 the indicator of Jewish names recall was significantly lower than in the group receiving the direct order, $\chi^2(1) = 7.15$; $p = 0.007$, but did not differ significantly from the indicator of the group receiving the negative order $\chi^2(1) = 1.09$; $p = 0.29$. Thus, the mention of the Jewish names included in the instructions had an impact (lesser, however, than the orders) on improved recall of the key names. In the case of the other nations the Kind of the communicate factor did not influ-

ence levels of recall. The value of the difference between recall of Jewish names and those of other nations in every group (McNemara test) was also established, as illustrated in Table 4.

In Group No. 1, both the Jewish names and the other nations names were recalled with equal frequency. A similar result was obtained in Group No. 2, in which the recall level was significantly lower only in the case of one nation when compared to the Jewish names (in Group No. 2 a side effect caused the French names to be recalled significantly more rarely). However, in Group No. 3 (the direct order) and Group No. 4 (the negative order) the Jewish names were recalled significantly more often than any other nation's names.

Discussion

Using only two keys in the stimulating words colours naming task did not change the results significantly. The impact of the direct order on the colours naming time was much more visible in the new conditions. The order to pay attention to the Jewish names in Group No. 3 lengthened

reaction times in comparison with those for comparative names; reaction times to all the names were longer in this group than in any other group. However, the negative order did not lengthen the names colours naming time, which was similar in both control groups.

In Experiment 3 (using two keys) the power of the facilitation effect was emphasized in the groups receiving the direct order and the negative order, both in comparison with other names in those groups as well as in the level of recall of the key names in the other two groups. However, in this experiment as well the results in Group No. 2 suggest that the level of names recall is influenced somehow not only by the communicate in the form of a directive, but also by the mere mention of the nation included in the instructions.

General discussion

Results of the three experiments described above support the view that using negative directives would paradoxically draw attention to the prohibited object. They highlight the automatic nature of the influence of such communicates. The experiments presented here can be interpreted in the context of communicative competence, for which the basic issue is the relationship between the speaker's intention and the effect achieved; in other words, the influence of the statement on its addressee. In the case of directives, the speaker's intention is to make the addressee follow the instructions in the statement. When we ask (demand, order, beg) "*Close the window*", the intention of this statement is fulfilled when the addressee closes the window (conversely, it is not fulfilled when the addressee remains indifferent or opens the window more widely).

To make any speech act effective, that is, compatible with the speaker's intention, several conditions have to be fulfilled (comp. Searle, 1969). Also, in respect of directives the authors of the theory of speech acts defined the conditions that must be fulfilled for them to be effective or fortunate (Grice, 1975); among them they list the preparatory condition and the essential condition. The preparatory condition is that the addressee is able to comply with the directive (the ability or possibility to do the action which the speaker wants to be done and the willingness to do this), and the essential condition is to understand the speaker's intention and to understand what is to be done.

Results of the memory test in all of the three experiments prove the effectiveness of direct orders. In comparison with the control groups, people who received the order to pay attention to the given object (comic character or Jewish names) then answered the questions related to those objects significantly better, proving fulfillment of the speaker's suggestions. Negative orders caused a completely opposite effect to the openly-declared intention of the speaker – results of the memory test show that participants paid attention to the given object in a similar fashion as those receiving the direct order. That occurred in spite

of fulfillment of the conditions for efficiency of the speech act which were discussed above. There is no reason to suppose that in the case of negative orders participants did not understand the content of the sentence or the intention of the order, or purposely sabotaged the suggestions and paid attention to the object. This means that the attention focus was unintentional and automatic. The direct order led to a controlled process of attention focus, which is proven by the delay in the names colours naming time (experiments 2 and 3) and the significantly worse answers to the control question than in the group receiving the negative order (Experiment 1).

Using the Stroop paradigm proves that an interference effect occurs as a result of the discrepancy between a word's content and its colour, as well as in the case of words possessing an affective meaning for the participant. The stimuli words used in those experiments did not have this character (no experiment demonstrated an interference effect in the control group for Jewish names, which means that the key nation for the experimental manipulation did not have any emotional significance for the participants). The results of experiments 2 and 3 show that the direct order stimulated the interference of the colour and the content of the words, making the colours naming time longer. This effect occurs in both of the experiments, most strongly in Experiment 3 during which participants used only two keys. In this experiment the group receiving the direct order named the Jewish names more slowly than the other nations names. A generally longer reaction time was also observed compared to the other groups. We may suppose that the order included in the instructions had a greater impact when participants were not burdened with operating more keys. The order to pay attention to the given nation names made the level of recall of those names greater, which could have been expected.

However, in the case of the negative order there was no interference effect observed; colours naming times in Group No.4 were similar to reaction times in the control groups. This means that registering the key names was not a controlled and intentional process but rather an unintentional and automatic one, and at the same time there was not sufficient attention focus to make reaction times longer. We draw conclusions about the registration of Jewish names from this group's memory test results, which were similar to those receiving the direct order. It is probable that two processes were responsible for this effect: the automatic registering of the content of the words that participants were **not** supposed to pay attention to (greater accessibility of those words) and controlled recall of the instructions' contents.

Besides the communicative competence context, this phenomenon may be placed in the context of language competence, i.e. questioning the mechanism of the effect achieved by using a negative order directive in reference to the issue of negation processing. In social and educa-

tional psychology the counterproductive effect of negation was noted long ago, such as when children asked not to do something often perform the forbidden action. We can record different explanations for this counterproductive negation effect. The best-known explanation is based on the reactance theory by Brehm, in which a forbidden action becomes especially tempting. Another explanation is based on the *scheme-plus-tag* model (Mayo et al., 2004); negation mark dissociation results in correspondence of a sentence with the negated state of affairs. Also, the two-step simulation hypothesis (Kaup et al., 2007) has been used to explain this phenomenon; to understand negation we must simulate the negated state of affairs mentally before asking the question of what action should be taken instead of the negated one.

In the introduction I referred to research on ignoring information and to Wagner's theory. Here we should emphasize the difference between those paradigms and the approach taken in the presented experiments. The key element in the experiments concerning the omission or ignoring of information (often using the courtroom paradigm) is use of the order *not* to pay attention to particular information.

In the courtroom paradigm the order not to pay attention to information is implemented *after* this information is given. Insight into the process causing omission or ignoring of information is gained by understanding the way it is represented in our memory, recalled from it and used in subsequent statements. In the presented experiments the suggestion *not to pay attention* was related to physical objects or words which in the future could be accessible to our perception. This experimental project would invoke the courtroom paradigm if the order not to pay attention to some evidence appeared before it was presented. It would be interesting to determine if greater difficulty in ignoring (omitting) such information actually occurred.

Wegner's experiments concerned mental control, not the process of communication. I made reference to his tests because Wegner had to use instructions including a negative order to initiate control understood as suppression. He achieved paradoxical effects in conditions of cognitive load. Those experiments were directly related to the impact of the negative orders on the participants' attention focus without the cognitive load, and the negative order was related to the elementary and automatic process of paying attention. In this paper we are interested in the directly communicative aspects of negation, or more precisely the compliance between the directive's intention and the addressee's reaction.

The results obtained show that negated directives (orders, suggestions, requests) may be *anti* counterproductive and provide the speaker with an effect opposite to that intended. Thus, if we wish to divert somebody's attention from a given object (or prevent them from paying attention to something), it is better not to say anything about the matter than use a negative order.

References

- Austin, J. L. (1962). *How to do things with words*. Oxford: Clarendon Press.
- Beukeboom, C. J., Finkenauer, C. I. & Wigboldus, D. H. J. (2010). The negation bias: when negations signal stereotypic expectancies. *Journal of Personality and Social Psychology*, 99, 978-992.
- Dalgleish, T. (1995). Performance on the emotional Stroop task in groups of anxious, experts and control subject: a comparison of computer and card presentation formats. *Cognition and Emotion*, 9, 341-362.
- Deutsch, R., Gawronski, B. & Strack, F. (2006). At the boundaries of automaticity: Negation as reflective operation. *Journal of Personality and Social Psychology*, 91, 385-405.
- Deutsch, R., Kordts-Freudinger, R., Gawronski, B. & Strack, F. (2009). Fast and Fragile. A New Look at the Automaticity of Negation Processing. *Experimental Psychology*, 56, 434-446.
- Giora, R., Balaban, N., Fein, O. & Alkabetz, I. (2005). Negation as positivity in disguise. In: H. L. Colston & A. Katz (eds.). *Figurative Language Comprehension: Social and Cultural Influences* (pp. 233-258). Hillsdale, NJ: Erlbaum.
- Giora, R. (2006). Anything negatives can do affirmatives can do just as well, except for some metaphors. *Journal of Pragmatics*, 38, 981-1014.
- Giora, R. (2007). "A good Arab is not a dead Arab—a racist incitement": On the accessibility of negated concepts. In: I. Kecskes & L. R. Horn (eds.), *Explorations in Pragmatics: Linguistic, Cognitive and Intercultural Aspects* (pp. 129-162). Berlin: Mouton de Gruyter.
- Giora, R., Fein, O., Aschkenazi, K. & Alkabetz-Zlozover, I. (2007). Negation in context: A functional approach to suppression. *Discourse Processes*, 43, 153-172.
- Giora, GR., Heruti, V., Metuki, N. & Fein, O. (2009). "When we say *no* we mean *no*": Interpreting negation in vision and language. *Journal of Pragmatics*, 41, 2222-2239.
- Grice, H.P. (1975). Logic and conversation. In: P. Cole & J. Morgan (eds.), *Syntax and semantics*, Vol. 3: *Speech acts* (pp. 41-58). New York: Academic Press.
- Jung Grant, S., Malaviya, P., Sternthal, B. (2004). The influence of negation on product evaluations. *Journal of Consumer Research*, 31, 583-591.
- Kaup, B. (2001). Negation and its impact on the accessibility of text information. *Memory & Cognition*, 29, 960-967.
- Kaup, B., Yaxley, R. H., Madden, C. J., Zwaan, R. A., & Lüdtke, J. (2007). Experiential simulation of negated text information. *Quarterly Journal of Experimental Psychology*, 60, 976-990.
- Lane, L.W., Groisman, M. F., Ferreira, V. S. (2006). Don't talk about pink elephants. *Psychological science*, 4, 273 - 277.
- Lyons, J. (1977). *Semantics*. Cambridge: University Press.
- MacDonald, M.C. & Just M. A. (1989). Changes in activation levels with negation. *Journal of Experimental Psychology*, 15, 633-642.
- MacLeod, C. M. (1991). Half a century of research on the Stroop effect: An Integrative approach. *Psychological Bulletin*, 109, 163-203.
- Mayo, R., Schul, Y. & Burnstein, E. (2004). "I am not guilty" vs "I am innocent": Successful negation may depend on the schema used for its encoding. *Journal of Experimental Social Psychology*, 40, 433-449.
- Mogg, K., Mathews, A., & Eysenck, M. (1992). Attentional bias to threat in clinical anxiety states. *Cognition and Emotion*, 6, 149-159.
- Nęcka, E., Orzechowski, J. & Szymura, B. (2006). *Psychologia poznawcza (Cognitive Psychology)*. Warszawa: PWN.
- Searle, J. R. (1969). *Speech acts*. Cambridge: Cambridge University Press.
- Schul, Y. & Manzur, F. (1990). The effect of type of encoding and strength of discounting appeal on the success of ignoring an invalid testimony. *European Journal of Social Psychology*, 35, 327-345.
- Schul, Y. (1993). When warning succeeds: The effect of warning on success of ignoring invalid information. *Journal of Experimental Social Psychology*, 29, 42-62.

- Sedik, G. & Krejtz, J. (2001). The subliminal neutralization of strong negative attitudes: The secret power of non-positive adjectives. *Polish Psychological Bulletin*, 32, 53-60.
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 12, 643-662.
- Wason, P.C. (1965). The context of plausible denial. *Journal of verbal Learning and verbal Behavior*, 4, 7-11.
- Wegner D. (1989). *White bears and other unwanted thoughts*. New York: Viking/Penguin.
- Wegner, D. M. & Wenzlaff, R. (1996). Mental control. In: E.T. Higgins & A.W. Kruglanski (eds.), *Social Psychology: Handbook of Basic Principles* (pp. 466-492). New York: Guilford Press.
- Wegner, D., Ansfield, M. & Pilloff, D. (1998). The putt and the pendulum: Ironic effects of the mental control of actions. *Psychological Science*, 9, 196-199.
- Yaeger-Dror, M. (ed.) (2002). Negation and disagreement. *Journal of Pragmatics* (Special Issue) 34.