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Striving for identity goals by self-symbolizing on Instagram

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Abstract
The present research applies symbolic self completion theory (SCT) to explain online behaviors and predict what users will post on Instagram. Across three experiments, we tested whether medical and law students who sense incompleteness with respect to their professional identity goals engage in compensatory self-symbolizing by increasing their online posting of respective indicators of goal attainment (e.g., medical coats, court clothes). Study 1 found that incomplete medical students post more medicine-related symbols. Study 2 replicated this effect in a sample of law students and clarified that students' self-symbolizing posts specifically relate to their incomplete goal (law career) and not to other non-pertinent domains (university life). Finally, Study 3 demonstrated that incomplete medical students only engage in self-symbolizing when their incompleteness refers to their career goal and not to other careers they do not aspire to (a law career). Implications for understanding online behavior, preventing negative consequences of self-symbolizing on social media, and deepening the study of self-completion processes are discussed.

Keywords Social media · Motivation · Identity goals · Self completion theory · Goal-oriented behavior

Although all social networking sites are suitable tools for self-presentation (Nadkarni & Hofmann, 2012; Ellison & Boyd, 2013), Instagram seems to have ideal features for self-expression and identity construction (Shane-Simpson et al., 2018). It is a mobile photo-sharing application that allows people to tell their stories through images. On Instagram, users can publish self-related pieces of information through various forms of posts. They can post photos, selfies, short videos, and captions (e.g., Lee et al., 2015), choosing either permanent (i.e., traditional posts that last indefinitely) or ephemeral content (i.e., content that remains public for 24 h, e.g., Choi et al., 2020), letting only their followers see their posts or any Instagram user (i.e., the entire Instagram audience; Sciara et al., 2023). Thanks to its affordances, then, posting on Instagram permits people to convey a specific image of themselves in the very moment they want to let others know, by communicating self-related content *on the spot*. By posting a single picture that lasts for a day, for instance, Instagram users usually tell their audience what they are doing, where they currently are, who they are spending time with, what goals they are striving for or have just achieved, or simply how they look like today. A medical student will thus be able to share a picture made during the night shift in the hospital showing a team of trainees. It indicates that the student is engaged in critical activities that will ultimately lead to being a successful physician. But what does motivate them to post such a picture?

Previous research tried to identify factors that motivate people to post certain self-related information on social sites like Facebook (e.g., Seidman, 2013; Wilson et al., 2012) and

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Instagram (e.g., Wong et al., 2019; Lee et al., 2015; Sung et al., 2016). It was found, for instance, that the use of Instagram is associated with the need for expressing the ideal self (Choi & Sung, 2018). Yet, the most research on social media use relies on descriptive studies, and only very few theoretical explanations of posting behaviors on social networking sites have been offered. The uses and gratifications approach (i.e., U&G; Katz & Blumler, 1974), for instance, suggests that people use social media to gratify their needs (e.g., Mäntymäki & Islam, 2016; Whiting & Williams, 2013), implying that users would use a specific social media again if it helped to satisfy their needs (Alhabash & Ma, 2017). Applying the U&G approach, past research found that gratification of needs for social interaction, entertainment, information, and self-expression are mentioned by users as the most relevant motives for Instagram use (e.g., Alhabash & Ma, 2017; Hwang & Cho, 2018; Lee et al., 2015).

A self-affirmation theory (Steele, 1988) based explanation of social media use (e.g., Toma & Hancock, 2013) posits that social media are attractive because they allow users to easily manage positive self-presentations, fulfilling their fundamental need for self-worth. As social networking sites allow self-affirmation by providing opportunities to construct positive self-images (e.g., showing off lists of friends, self-pictures), people who want to affirm their self-esteem can use these sites for presenting themselves in a positive light (Ellison et al., 2007). Toma and Hancock (2013, Study 2) demonstrated that ego-threatened Facebook users quickly gravitated toward their online profile attending to information that could help them feel worthy again.

Based on previous theoretical explanations, however, one cannot predict what kind of positive self-related information users will post. Why is a certain type of positive content posted instead of another? For instance, why should one post a picture of colleagues in white coat rather than a picture of friends watching a TV series? Research is missing that tests theory-based hypotheses regarding what kind of self-related content is posted and when people are ready to do so. The present research tries to find answers to these questions by turning to symbolic self completion theory (SCT; Wicklund & Gollwitzer, 1982; Gollwitzer et al., 1982). We suggest that a sense of identity goal incompleteness can stimulate the posting of content related to one's aspired-to identity, and that a sense of self-completion can be achieved through the sharing of specific symbols on social media platforms.

A self-completion approach: People can use social media for compensatory self-symbolizing

Drawing on early experimental work on goal striving (Lewin, 1926; Mahler, 1933), symbolic self completion theory (SCT; Wicklund & Gollwitzer, 1982; Gollwitzer et al., 1982) postulates that people can construct their identities by pursuing identity goals (e.g., becoming a physician, a lawyer, a good parent, an athlete). This can be done by doing and acquiring things that are in line with possessing these aspired-to identities (e.g., expressing relevant intentions, engaging in relevant activities, wearing respective clothes). These efforts—referred to as *self-symbolizing*—are not self-presentations geared towards making good impressions on others; rather, they are oriented towards achieving a sense of completeness with respect to the aspired-to identity goals. Such self-symbolizing efforts are particularly effective when they become a social reality—are noticed by others (Gollwitzer, 1986; Wicklund & Gollwitzer, 1982). A person who is committed to a particular identity goal (e.g., becoming a physician) and feels incomplete because of detecting shortcomings, can thus be expected to try to restore a feeling of completeness on the spot by pointing to available indicators of goal attainment, increasing their showing off of these symbols (e.g., Gollwitzer & Kirchhof, 1998). As social networking sites are ideal channels to let others know about one's indicators of completeness, people who feel incomplete should be drawn to social media to *increase* their sharing of relevant symbols and make this compensatory self-symbolizing public.

Self-completion is different from other self-presentation goals. Even if they both require an audience, self-completion is always domain-specific, not strategically aimed at impressing others, and implies the use of others like mere validators—for *registering symbols on them* (Gollwitzer, 1986; Wicklund & Gollwitzer, 1982). To claim the possession of a specific identity, in fact, people feel it is necessary that others become aware of the signs/indicators that demonstrate the possession of that identity (identity symbols). The acknowledgment of others ensures the maintenance of acceptable levels of completeness regarding that specific identity goal, or repristinate completeness when incompleteness is experienced. Therefore, since self-symbolizing individuals see in others nothing more than passive witnesses of their efforts, they do not care about others' reactions or perspectives. Unlike other more generic self-presentation goals and related strategies, then, self-completion goals may even lead incomplete people to ignore the preferences/interests of others if this means using them to register goal-related symbols and resolve incompleteness (e.g., Wicklund & Gollwitzer, 1981, Study 4; Gollwitzer, 1986).

Experimental evidence in favor of the theory's main hypothesis—the compensation hypothesis—comes from several studies (Gollwitzer & Kirchhof, 1998). It has been demonstrated that incompleteness causes people to symbolize the possession of the aspired-to identity by less admitting to failures (Gollwitzer et al., 1982), producing more positive

self-descriptions (Gollwitzer & Wicklund, 1985; Gollwitzer et al., 1982), showing less self-deprecation even if requested (Gollwitzer & Wicklund, 1985; Wicklund & Gollwitzer, 1981), displaying more identity-related material symbols (Wicklund & Gollwitzer, 1982), and using more expensive and prestigious objects (Braun & Wicklund, 1989).

Over the years, further forms of compensatory self-symbolizing have been suggested, such as showing off relevant material possessions (Carr & Vignoles, 2011), buying and consuming specific products (Dittmar & Beattie, 1998; Kim & Rucker, 2012), displaying professional titles in web pages and email signature files (Harmon-Jones et al., 2009), and endorsing immoral decisions as long as this implies the possession of an aspired-to successful businessman identity (Marquardt et al., 2016). Self-symbolizing was also demonstrated to effectively recreate a sense of completeness, with self-symbolizers showing a premature feeling of possessing the aspired-to identity (Gollwitzer et al., 2009), a greater internalization of the corresponding self-definition (Choi et al., 2020), and reduced intentions/efforts in further pursuit of the respective identity goal (e.g., Lalot et al., 2019; Longoni et al., 2014). Still, no studies experimentally tested the hypothesis that identity goal incompleteness could tempt people use social networking sites for self-symbolizing posting.

Demonstrating such a phenomenon would first have relevant implications for understanding online activities—it would allow making predictions about which self-related content social media users will post. It might also help users and professionals prevent some potential negative consequences of self-symbolizing on social media, such as the reduced motivation to engage in identity-related behavior resulting from a premature sense of completeness (Longoni et al., 2014; Lalot et al., 2019). Also, if it is found that identity goal completeness can be pursued through social media use, this would have important implications for advancing the study of self-completion processes. It would suggest that self-symbolizing is possible by collecting mere pieces of communication about alleged symbols (e.g., hashtags), using them as symbols themselves, as long as these are accessible to—and thus validated by—a virtual audience. Also, social media sites can be re-conceptualized as always-at-hand virtual audiences that people can use to validate their symbols at any time, compensate for incomplete identity goals, and thus construct their self-definition.

The present research

The present research applies SCT (Wicklund & Gollwitzer, 1982) to explain specific posting behaviors. We propose that university students[1] who sense incompleteness with respect to an aspired-to identity goal (i.e., their specific career goal[2]) engage in compensatory self-symbolizing on social networking sites by posting relevant symbols. Study 1 tested whether identity goal incompleteness causes medical students highly committed to becoming a medical doctor to post more medicine-related symbols on Instagram. Study 2 tested whether incompleteness also causes law students to post more career-related symbols, this time by checking whether this compensatory information is specifically related to the law career and not to other non-pertinent domains (e.g., university life). Finally, Study 3 tested the hypothesis that incomplete medical students only engage in medicine-related self-symbolizing when their incompleteness feelings refer to their aspired-to identity goal (i.e., becoming a physician) and not to another career goal they do not aspire to (e.g., becoming a lawyer). The procedures of the following studies have been approved by the Ethical Committee of Catholic University of the Sacred Heart of Milan in December 2019. All measures, manipulations, and exclusion of participants are disclosed, as well as the method of determining the final sample size of each study. Also, in all of the experiments, data collection was stopped before data analyses. All the studies' materials are available by emailing the corresponding author. The data that support the studies' findings are available at Open Science Framework (OSF): https://osf.io/rvx5p/?view_only=50b178044fca4221a731579bf755dc3d.

Study 1: Incomplete medical students post more medicine-related symbols on Instagram

The first experiment tested whether medical students highly committed to becoming a physician use Instagram to post medicine-related symbols to restore completeness when experiencing feelings of incompleteness regarding their identity goal. We recruited a sample of highly committed medical students, applied an experimental negative/positive feedback paradigm to manipulate incompleteness feelings (e.g., Marquardt et al., 2016), and observed subsequent use

[1] The present experiments addressed populations of university students on purpose. As students from the same schools (e.g., medical school, law school) generally share the same identity goals (e.g., becoming a physician, becoming a lawyer), they represent the best case for studying symbolic self-completion processes (e.g., Gollwitzer et al., 2009).

[2] We focused on professional/career identity goals as a choice of convenience. First, targeting a career goal enables recruiting homogeneous samples with the same identity goal by sampling in respective university courses (e.g., medicine faculties). Second, completeness towards career goals is relatively easy to manipulate through a bogus feedback procedure; the predisposition (or readiness) to become the aspired-to professional can be varied to induce temporary incompleteness feelings. Third, among other goals, past research already focused on career goals for testing SCT predictions.

of an Instagram profile. The study was conducted prior to the pandemic entirely in person.

Method

Participants, design, and sample size determination

Sixty-six Italian medical students[3] (39.4% females; M_{age} = 24.55 years old, SD_{age} = 6.51; ranging from 18 to 58 years old) volunteered in a one-factorial between-subjects experiment, in which completeness regarding the identity goal of 'becoming a physician' was experimentally varied. Participants were randomly assigned to one of two conditions (Identity Goal Completeness: complete vs. incomplete). Self-symbolizing efforts in terms of relevant medicine-related Instagram posts served as the dependent variable. Nearly all of the participants had an Instagram account (98.5%), and the vast majority of them indicated to use it very often (15.2% almost continuously; 65.2% very often; 18.2% quite often; and 1.5% rarely), as well as social networking sites in general (9.1% almost continuously; 56.1% very often; 27.3% quite often; 6.1% rarely; and 1.5% never).

To determine the above sample size, we computed a meta-analytic integration of results found by two recent experiments conducted to detect effects of experimentally varied incompleteness on self-symbolizing efforts that had used the same experimental design we intended to apply (Marquardt et al., 2016, Experiments 1 and 2). We obtained a resulting average effect size of $d = 0.62$ in pairwise comparisons (i.e., a *medium* effect according to Cohen, 1988). Hence, using the computer program G*Power 3.1 (Faul et al., 2007), a power analysis revealed that significant effects of such a magnitude required a sample size of 33 participants per experimental condition to be detected, resulting in a total sample size of 66 participants (statistical power 80%; $\alpha = 0.05$; one-tailed tests; non-centrality parameter $\delta = 2.52$). Thus, our study had 80% power to detect an effect size of at least $d = 0.62$ in pairwise comparisons ($\alpha = 0.05$; one-tailed tests; non-centrality parameter $\delta = 2.51$).

Procedure

Data collection was explained to participants as pertaining to two independent studies. The first part of the experiment was introduced as a study exploring medical students' psychological readiness to become a medical doctor, and the second one as assessing people's general preferences in creating Instagram profiles. After participants gave their informed consent, they individually and anonymously filled out a first questionnaire entailing demographic questions, items assessing social media usage, and a measure of commitment towards the identity goal of 'becoming a medical doctor'. Then, participants filled out a bogus psychological test and received feedback about their readiness to becoming a physician. In order to vary participants' sense of identity-goal completeness, half of them were randomly assigned to the 'complete' condition and received positive feedback, while the other half to the 'incomplete' condition and received negative feedback. Participants then completed a brief task on Instagram called 'Create your ideal Instagram profile', an activity intended to elicit students' self-symbolizing regarding their identity goal of becoming a physician. We offered participants a new empty public profile on Instagram and asked them to complete it with 6 posts (i.e., photos), optional captures, and a profile picture, creating the best possible profile but always trying to really express themselves. Specifically, participants had to (a) choose and post six pictures from a given set of 40 photographs (presented all together and in random order), and (b) select a profile picture from the same set. The time (effort) dedicated to this task was also registered. At the end of the study, participants were carefully debriefed[4] and thanked for their participation. After the debriefing session, participants received a gift (i.e., a snack) for their contribution (i.e., we let them choose their favorite snack among various choices).

Commitment questionnaire

To assess participants' commitment to becoming a medical doctor, we used a 5-item paper-and-pencil questionnaire created along the lines of previous studies' measuring identity goal commitment (e.g., Gollwitzer et al., 2013): "*How important is becoming a medical doctor for you?*"; "*Right now, how committed do you feel to the goal of becoming a physician?*"; *"How dedicated do you feel to your career goal in daily life?"; "How bad would it be if you could not continue studying medicine?"; "How bad would it be if you could not become a medical doctor after graduation?"*. Answers were provided on 7-point scales ranging from 1 (*not important at all*) to 7 (*very important*) with a resulting Cronbach's α of 0.67 (5 items); a mean score for commitment was computed by using all the 5 items.

[3] At the time of the study, all participants were students enrolled in the medical school of an Italian private university in Milan.

[4] We debriefed participants individually and in person. We started out with explaining SCT and how we wanted to test it in the present study. We were clear about the bogus nature of the presumed psychological readiness test, explicating why we used negative/positive feedback to induce incompleteness/completeness. Finally, we dedicated unlimited time to answer each participant's questions. Once participants had no questions anymore, we gave them our contact information if any further questions might come up later.

Variation of identity goal completeness

To vary completeness towards the identity goal of becoming a physician, we randomly assigned participants to one of two experimental conditions of completeness (complete vs. incomplete) and applied a classic experimental negative/positive feedback paradigm—the paradigm traditionally used in previous studies for testing SCT's hypotheses (e.g., Lalot et al., 2019; Marquardt et al., 2016; Longoni et al., 2014). In the first part of the procedure, participants were handed a tablet computer and asked to complete an online psychological test apparently aimed at evaluating medical students' psychological readiness to successfully work as a physician. This bogus test consisted of 16 multiple-choice questions made up to be plausible but sufficiently ambiguous, not to let participants doubt their final outcome (e.g., "*When someone needs help, do you feel like helping her/him even if not requested?*"). Upon completion, participants had to wait a short amount of time during which the site ostensibly was computing and uploading the results. Then, participants assigned to the complete condition received positive feedback, while participants assigned to the incomplete condition received negative feedback: "*Your psychological readiness to become a medical doctor is below/above the national average for your age group. Specifically, the test showed that your psychological readiness to work as a physician is at the 52nd /79th percentile".* We explicitly asked participants not to comment aloud on their results to prevent spontaneous self-symbolizing.

Self-symbolizing measures

To measure self-symbolizing regarding the identity goal of becoming a physician, we asked participants to use their smartphone to complete a task on Instagram called 'Create your ideal Instagram profile'. We offered participants a new empty profile on Instagram and asked them to complete it with 6 posts (i.e., photos), optional captures, and a profile picture, creating the best possible profile. Specifically, participants had to (a) choose and post six pictures from a given set of 40 photographs, and (b) select a profile photo from the same set. Half of the 40 photos entailed some explicit reference to medicine, while the other half framed similar things without any reference to medicine (e.g., the same character with or without a medical white coat; the same desk full of books with or without a stethoscope on it; the same view with or without a hospital in the distance; see Fig. 1 for some examples). To facilitate identification with the people depicted in the photos, we included photos of both a young male and a young female, in equal proportions. We coded reference to medicine within participants' profiles into *two dependent variables* of self-symbolizing: (1) the number of medical photos posted by participants, with scores ranging from 0 (no medical posts at all) to 6 (all posts contained some reference to medicine), and (2) the choice of the profile picture as a dichotomous variable, with the presence (*absence*) of reference to medicine indicating self-symbolizing (*no self-symbolizing*).

We piloted the Instagram task, the entire set of photos, the two indicators of self-symbolizing (number of medicine photos and the choice of the profile picture), and the ease of identifying with the characters shown in the pictures with 12 nursing students. Upon completion of the task, they reported their impressions in expressing themselves through the Instagram profile and indicating which photos of the set contained an explicit reference to medicine. Results suggested that the task was engaging and that students had no difficulty identifying with the depicted characters. Specifically, participants' levels of self-reported identification with pictures' characters ($M = 5.25$; $SD = 1.06$), their feeling that the created profile truly represented themselves ($M = 5.67$; $SD = 0.78$), their commitment to creating the profile ($M = 6.19$, $SD = 0.74$), and their engagement in doing the task ($M = 6.00$; $SD = 0.95$) were well above the scale midpoint (scale midpoint: 4), $t_s(11) \geq 4.10$, $p_s \leq 0.002$. In addition, we deleted and replaced one ambiguous photograph in accordance with the obtained insights, so that the definitive set contained 20 photos that *all* participants of the pilot recognized as having some reference to medicine and 20 photos they recognized as having no reference to medicine.

Results and discussion

Preliminary analyses

Participants' commitment towards the goal of becoming a medical doctor was strong ($M = 6.33$, $SD = 0.46$; bootstrap 95% *CI* with 5,000 resamples [6.21, 6.43]), and significantly higher than the scale midpoint (scale midpoint = 4), one-sample $t(65) = 40.74$, $p < .001$, $d = 5.07$. It is safe to assume, therefore, that the prerequisite (i.e., goal commitment) for expecting participants to engage in medicine-related self-symbolizing behaviors after an incompleteness induction was fulfilled.

To check on the time the participants of the two experimental groups dedicated to the Instagram task, we ran a preliminary comparison and found that incomplete students ($M = 11.30$ min, $SD = 2.96$; bootstrap 95% *CI* [9.77, 12.39]) spent about the same time on Instagram as complete students ($M = 11.06$ min, $SD = 3.82$; bootstrap 95% *CI* [10.28, 12.27]), $t(64) = 0.29$, $p = .774$, $d = 0.07$.

Fig. 1 Examples of pictures used in Study 1 and Study 3. *Note* Above are examples of the pictures that participants were able to select and post on Instagram during the completion of the 'Create your ideal Instagram profile' task of Study 1 and for the creation of the multiple-photo post of Study 3. The given set of 40 pictures presented two types of photographs: half of the photos purposely contained some explicit reference to medicine (e.g., students with medical uniforms and instruments; see the pictures in the top row), while the other half did not contain any reference to medicine, even though framing similar or exactly the same subjects (e.g., the same persons without medical uniforms or instruments; see the pictures in the bottom row). The number of pictures with reference to medicine posted by participants and the additional photo used as the Instagram's profile picture, served as measures of self-symbolizing

The effect of incompleteness on Instagram behaviors

Figure 2 shows a couple of examples of how participants' Instagram profiles looked like at the end of the 'Create your ideal Instagram profile' task—the task designed to detect online self-symbolizing efforts. To test whether incomplete medical students actually engaged in compensatory self-symbolizing by posting more medicine-related professional symbols on Instagram, we ran a one-way (Identity Goal Completeness: complete vs. incomplete) ANOVA with the number of medicine-related photos posted by participants as the dependent variable. Results revealed that medical students in the incomplete condition posted more photographs with medicine-related symbols ($M = 3.52$, $SD = 1.20$; bootstrap 95% *CI* with 5,000 resamples [3.09, 3.91]) than those in the complete condition ($M = 2.12$, $SD = 1.05$; bootstrap 95% *CI* [1.76, 2.45]), $F(1, 64) = 25.10$, $p < .001$, partial $\eta^2 = 0.282$. Notably, the effect size of the influence of incompleteness on self-symbolizing was of $d = 1.25$, a very large effect (Cohen, 1988).

To further test our hypothesis, we conducted a *chi-square* test for the effect of the manipulated sense of incompleteness/completeness on the choice that participants made for the Instagram profile picture (i.e., the second dependent variable; see Fig. 2 for a couple of examples of profile pictures). As expected, incomplete medical students more frequently selected and published profile photos with symbols clearly related to medicine (e.g., see the person wearing a medical uniform), $\chi^2(1) = 7.44$, $p = .006$, $\varphi = 0.336$. Precisely, 61% of medical students in the incomplete condition chose a medicine-related photo to represent the entire profile (adjusted residual = 2.7), while only 27% of those in the complete condition did so (adjusted residual = -2.7). We found an effect size of $\varphi = 0.336$, which qualifies as a *medium* effect according to Cohen (1988).

In sum, incomplete medical students who just learned that their psychological readiness to work as a physician was low, compensated by sharing on Instagram a higher number of photos in which the main character clearly indicated being (or being very close to become) a medical doctor. We detected medium to very large effect sizes, suggesting that

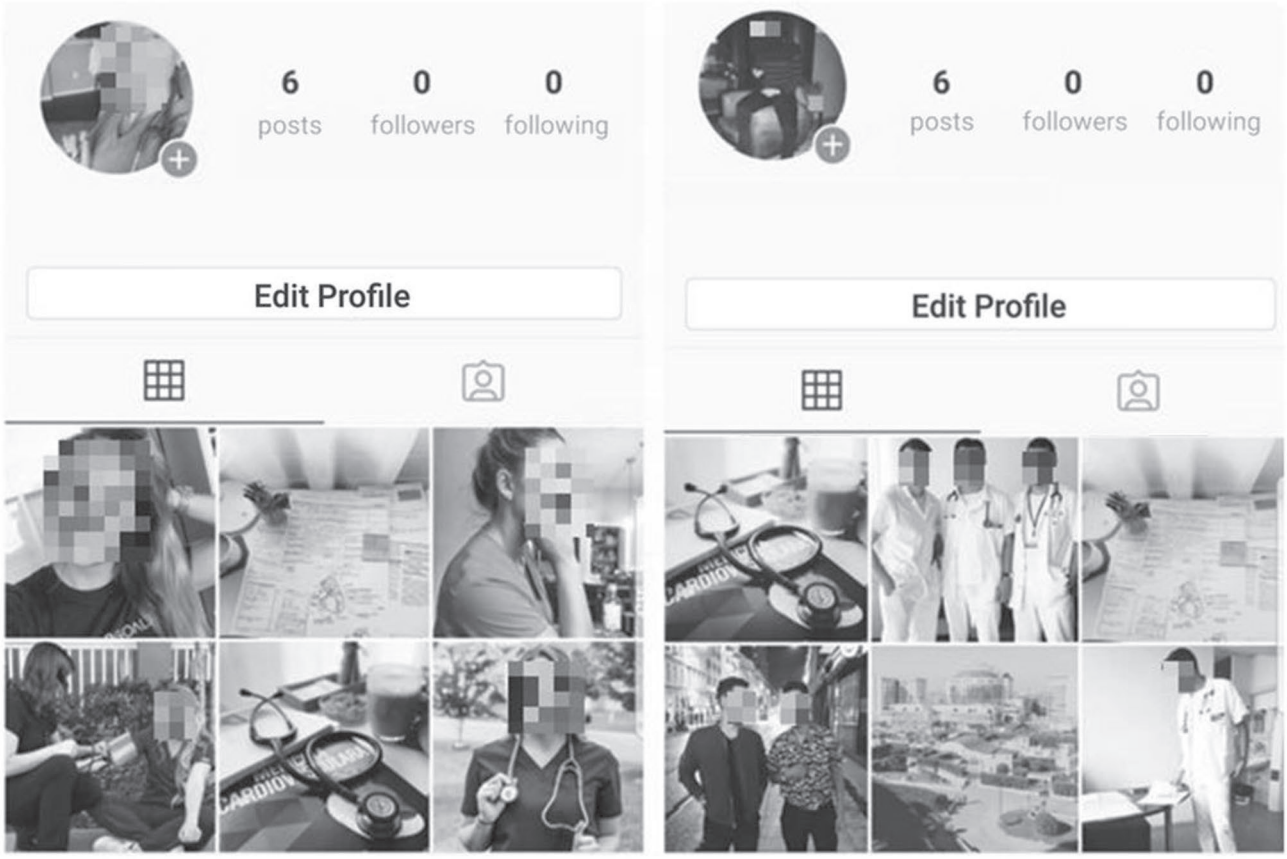

Fig. 2 Examples of the Instagram profiles created by participants in Study 1. *Note* Two examples of the Instagram profiles created by medical students of Study 1 during the 'Create your ideal Instagram profile' task. All participants' profiles counted a total of 6 posts (i.e., 6 photos selected from the given set of 40 photographs) and one profile picture (always selected from the same set). The above Instagram profiles have been created by a female student (on the left) and a male student (on the right)

incompleteness towards an identity goal to which one feels highly committed (e.g., realizing the identity goal of becoming a medical doctor) has a strong impact on online behaviors (see Cohen's interpretation of effect sizes, 1988).

Study 2: Incomplete law students also use Instagram for self-symbolizing

Study 2 aimed at replicating and extending the results of Study 1, demonstrating that incomplete law students post more online content specifically related to the self-defining goal of succeeding in a law-related profession. We thus designed a new experiment to replicate the effect of manipulated incompleteness on using social media for self-symbolizing, this time (a) applying an online procedure throughout the experiment (the data collection was conducted during the pandemic), (b) targeting a new sample (i.e., law students), and (c) not only offering self-symbolizing options in the identity goal domain targeted by the given negative/positive feedback but providing the opportunity to self-symbolize about a domain with respect to which participants were not discouraged or reassured (e.g., the university life domain). In so doing, Study 2 intended to test two main hypotheses. First, we expected incomplete law students to use Instagram for pertinent self-symbolizing, sharing comparatively more symbols related to success in the professional domain of law. Second, we expected that after negative feedback pertaining to their readiness to attain their career identity goal in the law domain, law students would increase the sharing of pertinent symbols and not non-pertinent ones, such as university-related symbols (i.e., unrelated to the goal of becoming a successful professional in the domain of law). Moreover, in Study 2, we kept the same feedback-based manipulation of incompleteness/completeness but extended the dependent variables of pertinent self-symbolizing from two to three. In order to test our additional hypothesis and confirm that self-symbolizing is specific (it is only observed in the identity goal domain where an incompleteness has been experienced), we added two additional dependent

measures of self-symbolizing related to the university life domain—that is, not related to becoming a successful legal professional.

Method

Participants and design

A total of 72 Italian law students (81.9% females; M_{age} = 26.33 years of age, SD_{age} = 5.36) volunteered in the experiment. Following the lead of previous studies on SCT (e.g., Longoni et al., 2014; Marquardt et al., 2016), we excluded 5 participants whose commitment level towards the personal career goal of becoming a successful legal professional was below the scale midpoint (11-point scale, scale midpoint = 5; 4 of the excluded participants were in the complete condition, 1 in the incomplete condition). Therefore, our final sample amounted to 67 committed law students[5] (83.6% females; M_{age} = 26.40 years of age, SD_{age} = 5.49; ranging from 20 to 45 years old; commitment: M = 7.82, SD = 1.28).

As Study 1 reported a very large effect size in pairwise comparisons (i.e., Cohen's d = 1.25), the above sample size was originally intended to simply equal the N of the sample of Study 1, with around 33 participants per cell. However, as the law students we randomly assigned to the two experimental groups did not complete the online questionnaires in equal proportions[6], we obtained two groups with different numbers of participants. Specifically, we reached a number of 28 in the incomplete condition and 39 in the complete condition; we had 80% power to detect an effect size of at least d = 0.62 in pairwise comparisons (i.e., a medium effect according to Cohen, 1988; α = 0.05; one-tailed tests; non-centrality parameter δ = 2.51; see *G*Power 3.1*, Faul et al., 2007).

In Study 2, we again applied a one-factorial between-subjects design, in which completeness regarding participants' identity goal of being successful in the legal profession was experimentally varied (Identity Goal Completeness: complete vs. incomplete). The content of an Instagram multiple-photo post served to assess three measures of law-related self-symbolizing (i.e., the number of selected law-related photos, the reference to law contained in the text, and the chosen law-related hashtags) and two measures of university-related self-symbolizing (the reference to university life contained in the text, and the chosen university-related hashtags). At the beginning of the study, we also asked participants about their current career goal in the law domain (e.g., becoming a lawyer, judge, diplomat, or prosecutor); the commitment items then targeted this very career goal. Of the participants, 38.8% wanted to become a lawyer, 20.9% a judge, and 11.9% a law-related professional in a governmental administration, while the rest of them declared various other law-related career goals (e.g., diplomat, notary public). The vast majority of the final sample had an Instagram account (94%), and most participants indicated to use it very often (20.9% almost continuously; 37.3% very often; 26.9% quite often; 7.5% rarely; and 7.5% never), as well as social networking sites in general (16.4% almost continuously; 37.3% very often; 38.8% quite often; 6% rarely; and 1.5% never).

Procedure

The research was described to participants as pertaining to two different studies. The first study was introduced as exploring the students' psychological readiness to take up the desired profession in the law domain, and the second one as assessing people's reactions to others' Instagram posts. With respect to this second study, participants were informed in advance that they will be asked to create an anonymous Instagram post to be published online on a laboratory Instagram page. After participants gave their informed consent, they were first asked to fill out a 15 min online survey composed of three parts. The first part asked them about demographics, their social media usage, their current career goal (e.g., becoming a lawyer), and their commitment towards this goal. In the second part of the survey, they filled out a bogus psychological test and then received negative/positive feedback about their readiness to work as the desired professional (e.g., lawyer), depending on whether they had been assigned to the incomplete or the complete identity goal condition. In the third and last part of the questionnaire, participants were required to create an anonymous multiple-photos post on Instagram selecting 6 photos from a given set of images, writing a brief text under the post, and finally choosing 6 related hashtags. At the end of the procedure, and regardless of whether participants completed the entire survey, all participants were very

[5] At the time of data collection, all participants were enrolled in the law schools of various Italian public universities. Specifically, our participants came from all parts of Italy (i.e., north, central, and south).

[6] Participants assigned to the two conditions did not complete the online questionnaire in equal proportions. This disproportion was presumably due to our incompleteness manipulation. As revealed by the debriefing sessions of the current and past studies applying the same bogus feedback procedure (Sciara et al., 2022), participants who receive negative feedback more frequently lose interest during completion than their counterparts and thus drop from the online survey before the dependent variables are assessed (i.e., before Instagram posting). An equivalent in-person procedure resolves this disproportion (see Study 1).

carefully debriefed[7] and thanked for participation. Further, to reward their participation, participants who fully completed the survey were given the possibility to take part in an online lottery where they could win 6€ Amazon bonuses.

Commitment questionnaire

After participants communicated their current career goal (e.g., becoming a lawyer, a judge, a diplomat), we assessed participants' commitment to attain this goal using a 5-item questionnaire with the same questions used in Study 1, but this time all referring to the specific professional goal indicated by participants (e.g., "*How important is becoming a judge for you?"*). Answers were provided on an 11-point scale ranging from 0 (*not important at all*) to 10 (*very important*); the mean of the 5 items indicated the participants' level of commitment (Cronbach's $\alpha = 0.73$; 5 items).

Variation of identity goal completeness

To vary completeness towards the identity goal of becoming the desired law-related professional (complete vs. incomplete), we applied the feedback paradigm used in Study 1 based on past symbolic self-completion research (e.g., Lalot et al., 2019; Marquardt et al., 2016; Longoni et al., 2014).

Self-symbolizing measures

To measure law students' self-symbolizing, we asked participants to create an anonymous Instagram multiple-photo post (i.e., an Instagram post that entails more than one picture, usually accompanied by a brief text and some hashtags). To get participants motivated to assemble the post with great care and in line with their usual excitement of communicating with an audience, we explicitly asked them to *express themselves* in creating the post. Also, we explained to them that the post will be published on a lab Instagram page to study online users' responses to certain topics, and that around 200 followers of our lab page will ultimately view their post (for more about the importance of believing there is an audience, see Wicklund & Gollwitzer, 1982; Gollwitzer et al., 2009). To assemble their post, we asked participants (a) to select 6 pictures from a fixed set of 42 pictures (presented all together and in random order), (b) write a brief description of themselves, and (c) freely choose a total of 6 pertinent hashtags. The order of the tasks required to assemble the post strictly followed the order imposed by Instagram in real settings (i.e., photos' selection first, then the writing of a caption, and finally the adding of hashtags; see Landsverk, 2014; Serafinelli, 2018). The instructions specifically highlighted that this post did not need to be related to the participants' career/educational goals; they simply should introduce themselves and disclose their real interests and life activities.

The set of pictures offered to participants to choose from included 20 photos with explicit reference to law and/or law-related professionals (e.g., a lawyer in front of the jury, lawyers and judges wearing the respective outfits, a handshake between persons with very formal clothes, a courtroom, a judge gavel); 20 photos with similar subjects but without any reference to law and law-related professionals (e.g., an informally dressed person in front of an audience, various people wearing very informal clothes, a handshake between friends wearing informal clothes, the room of a theatre, an antique globe); and 2 neutral pictures of some food (a plate of spaghetti, an Italian dessert), inserted in order to avoid the impression that each law-related photo offered was matched by a non-law related alternative. Again, to facilitate participants' identification with the people depicted in the photos, we included photos of both males and females, in equal numbers; also, the pictures showing a person did not show their face (see Fig. 3).

To code the content of the written text (i.e., the brief self-description included in the Instagram post), we performed a word analysis using the Italian version of the Linguistic Inquiry and Word Count (LIWC) software (Alparone et al., 2004; Pennebaker et al., 2007). LIWC has been widely used in previous studies (for a review, see Tausczik & Pennebaker, 2010), and recently also in the field of social media psychology (e.g., Marengo et al., 2019). To create suitable dependent variables for testing our hypotheses, we created two ad hoc critical lists of words: the first was related to the law domain (i.e., the domain of the participants' identity goal targeted by the incompleteness/completeness manipulation), while the second was related to the non-pertinent domain of university life. To create these lists of words, we first and *a priori* listed Italian words related to each specific domain (e.g., the Italian translation of "judge", "law", "lawyer", "court", in the law related list; and "study", "exams", "student", "graduation", in the university-life related list). We then asked two independent raters who were blind to conditions, to read the texts written by the participants and circle those words related to either the law or the university domain. All of the words marked by both raters that had not been put on our lists before were then added. Notably, the two lists of words did not overlap; none of the listed words

[7] We asked participants to read a debriefing text that explicated to them in detail the nature of our procedure, with a transparent description of the bogus psychological test and a clear justification for the use of such an experimental paradigm. To also inform the people who did not take part in the study or had left the study before completion, we posted public debriefing messages on all the private and public pages we had used to recruit the sample. We also gave participants the opportunity to contact us via email and ask any further questions that might arise.

Fig. 3 Examples of pictures used in Study 2. *Note* In the second study, the given set of pictures contained 20 photos with explicit reference to law (e.g., a handshake in very formal clothes; see the pictures in the top row), and 20 photos with similar themes but without any reference to law (e.g., a handshake in informal clothes; see the pictures in the bottom row). The number of selected pictures with reference to law was one of the measures of self-symbolizing

were indicated by raters as belonging to both domains. Once the two word lists were imported into LIWC, we had the software score the portion of the text related to each domain. We thus obtained two LIWC scores: the text making reference to law (the law score), and the text making reference to university life (the university score). Higher scores indicated a more frequent use of words from the respective domain. For an exhaustive description of the LIWC analysis and related procedures, see the LIWC software documentation (Pennebaker et al., 2007).

To count the hashtags related to the law domain and those related to the university domain, we asked the two independent raters who had looked at the written texts marking law-related words and university-related words to also look at each hashtag cited by the participants, assigning it to one domain (law vs. university), both, or none of them. As there was no disagreement between their ratings, we simply counted for each participant the total number of cited hashtags related to law (e.g., #law, #justiceworld, #lawyertobe), and the total number of hashtags related to university life (e.g., #studentlife, #university, #graduation). There were some overlapping classifications; hashtags that pertained to both categories simultaneously (e.g., #lawstudent) were thus counted for both.

The content of the Instagram multiple-photo post was thus evaluated in terms of three measures of self-symbolizing related to law, and two measures of self-symbolizing related to university life. The three main dependent variables of law-related self-symbolizing were: (1) the number of law-related pictures selected by participants with values ranging from 0 (no picture with reference to law) to 6 (all selected pictures presented some reference to law), (2) frequency of referring to law-related themes within the text of the Instagram post, analyzed via the LIWC word analysis (e.g., Alparone et al., 2004; Pennebaker et al., 2007), and (3) the number of freely cited hashtags related to law-related issues, ranging from 0 (none of the selected hashtags was related to law) to 6 (all the selected hashtags were related to law). For all of these three variables, higher scores were associated with more intense law-related self-symbolizing.

The two additional dependent variables of university-related self-symbolizing were: (1) frequency of referring to university life related themes in the text of the Instagram post, also obtained via an LIWC analysis, and (2) the number of cited hashtags related to university life, ranging from 0 (none of the cited hashtags was related to university life) to 6 (all of the cited hashtags were related to university life). For both variables, higher scores indicated more self-symbolizing related to the university life domain.

Results and discussion

Preliminary analyses

Before including the LIWC scores in our main analyses, we checked whether the self-description participants wrote for the Instagram post did not present substantial differences among conditions in the length of the text written. We indeed found a slight difference in the total word counts of complete ($M = 94.33$ words, $SD = 60.32$; bootstrap 95% CI [76.74, 114.08]) versus incomplete participants ($M = 77.79$ words, $SD = 41.34$; bootstrap 95% CI [63.47, 93.64]). This difference, however, did not reach statistical significance, $t(65) = 1.25$, $p = .214$, $d = 0.31$. Apparently, incompleteness feelings did not lead participants to write longer self-presentations.

We also checked whether there was homogeneity of variances among conditions with respect to all of our dependent variables. As assessed by Levene's test for equality of variances, we found equality for participants' posting of law-related pictures and university-related hashtags, $p_s \geq 0.136$, but not for their posting of law-related text, university-related text, and law-related hashtags, $p_s \leq 0.039$. In all these cases, we complemented our analyses with non-parametric tests.

The effect of incompleteness on pertinent self-symbolizing on Instagram

Table 1 reports the descriptive statistics for pertinent, law-related self-symbolizing. To test whether incomplete law students engaged in compensatory self-symbolizing by posting more law-related pictures on Instagram, we ran a one-way (Identity Goal Completeness: complete vs. incomplete) ANOVA with the number of selected law-related photos as the dependent variable. As predicted, law students in the incomplete condition selected more photographs with law-related symbols than those in the complete condition, $F(1, 65) = 12.09$, $p = .001$, partial $\eta^2 = 0.157$ (see Fig. 4). Notably, we documented an effect size of Cohen's $d = 0.87$ (i.e., a large effect; Cohen, 1988), indicating that inducing identity goal incompleteness in law students had a strong impact on Instagram posting behaviors.

A one-way ANOVA (Identity Goal Completeness: complete vs. incomplete) with the LIWC law score as the dependent variable further examined the effect of incompleteness on law-related self-symbolizing. The effect of incompleteness on text-based self-symbolizing was only marginally significant, with students in the incomplete condition who tended to write self-descriptions using more words related to the law domain than did students in the complete condition, $F(1, 65) = 3.61$, $p = .062$, partial $\eta^2 = 0.053$ (Cohen's $d = 0.48$; see Table 1; Fig. 4). A Mann-Whitney test did not find the expected difference, $p = .193$.

A final analysis tested whether incompleteness also increased the citation of hashtags related to law. We ran a one-way ANOVA (Identity Goal Completeness: incomplete vs. complete) with the number of cited law-related hashtags as the dependent variable. Against our predictions, law students in the incomplete condition did not appear to select more law-related hashtags if compared to those in the complete condition, $F(1, 65) = 0.29$, $p = .594$, partial $\eta^2 = 0.004$, $d = 0.14$ (see Table 1; Fig. 4). A Mann-Whitney test confirmed this absence of difference, $p = .937$. This might be due to various reasons. One possibility is that the dependent variable of selecting relevant hashtags (i.e., the total number of law-related hashtags proposed to be published on Instagram) does not qualify as a very sensitive measure of self-symbolizing, as participants hardly selected more than one law-related hashtag to be posted on Instagram: 20.9% cited zero law-related hashtags, 40.3% just one hashtag, 16.4% two hashtags 16.4% three hashtags, 1.5% four hashtags, 4.5% five hashtags, and 0% cited six law-related hashtags, resulting in a right-skewed distribution (skewness = 0.96, $SE = 0.29$). Another plausible explanation however pertains to the fact that incomplete participants might have already resolved their incompleteness feelings through the posting of law-related photos (our first dependent variable) and through tilting the requested self-presentational text towards self-symbolizing the possession of a law-related identity (our second dependent variable). In other words, incomplete participants did no longer need to further self-symbolize by using hashtags, since they already had restored completeness by posting pictures and self-descriptive texts. In the current study, the three phases for the creation of the post intentionally followed the same order proposed by Instagram in natural settings (see Landsverk, 2014; Serafinelli, 2018). However, future research offering more than one route to self-symbolizing might want to randomize the order in which these are presented to clarify if incompleteness actually influences all the three forms of self-symbolizing (see Study 3).

Table 1 Law students' self-symbolizing on Instagram as a function of manipulated goal completeness in Study 2

		Identity Goal Completeness	
		Complete N = 39	Incomplete N = 28
Pictures Related to Law	*M (SD)*	2.46 (1.33)	3.68 (1.52)
	Bootstrap 95% CI	[2.08, 2.90]	[3.14, 4.21]
Text Related to Law (LIWC Score)	*M (SD)*	1.31 (1.51)	2.33 (2.85)
	Bootstrap 95% CI	[0.86, 1.84]	[1.39, 3.46]
Hashtags Related to Law	*M (SD)*	1.44 (1.10)	1.61 (1.52)
	Bootstrap 95% CI	[1.13, 1.81]	[1.07, 2.15]

Note. The number of law-related pictures ranged from 0 to 6 pictures; the text related to law, as scored by the LIWC vocabulary analysis, ranged from 0 to 11.11; the number of law-related hashtags ranged from 0 to 6. Bootstrap estimates for 95% CI_s for the means were obtained with 5'000 resamples. N_s indicate the number of participants within each cell

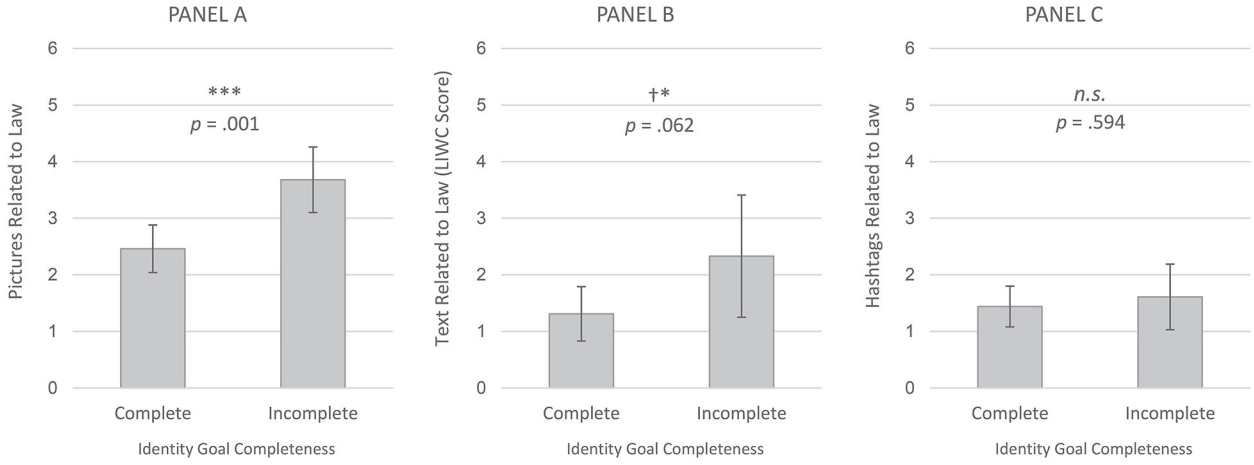

Fig. 4 Self-symbolizing efforts on Instagram shown by law students in Study 2. *Note* Self-symbolizing efforts on Instagram (i.e., choice to post law-related pictures, text, and/or hashtags) shown by law students in Study 2 depending on identity goal completeness (complete vs. incomplete). The number of law-related pictures (PANEL A) ranged from 0 to 6, with 6 indicating that all selected pictures presented reference to law (highest self-symbolizing). The text related to law, as scored by the LIWC vocabulary analysis (PANEL B), ranged from 0 to 11.11 (i.e., the maximum level observed for the LIWC 'law score' in Study 2), with higher values indicating a higher frequency of law-related words within the text of the Instagram post (higher self-symbolizing). The number of law-related hashtags (PANEL C) ranged from 0 to 6, with 6 indicating that all cited hashtags were related to law (highest self-symbolizing). Error bars represent 2 standard errors of the mean

The absence of effects of incompleteness on non-pertinent self-symbolizing

To check whether incompleteness feelings about an aspired-to specific career goal (e.g., becoming a lawyer) also affects non-pertinent self-symbolizing (i.e., university-related self-symbolizing via posting of symbols broadly related to university life), we repeated the above analyses substituting the law-related dependent variables with the two measures of university-related self-symbolizing. In line with our predictions, a first one-way ANOVA (Identity Goal Completeness: complete vs. incomplete) demonstrated that the LIWC university score did not differ among conditions, $F(1, 65) = 1.65$, $p = .203$, partial $\eta^2 = 0.025$, $d = 0.32$, and a Mann-Whitney test also confirmed this result, $p = .305$. More specifically, incomplete law students did not use university-life related words more frequently than complete students (incomplete: $M = 2.36$, $SD = 2.42$; bootstrap 95% CI [1.51, 3.41]; complete: $M = 1.65$, $SD = 2.06$; bootstrap 95% CI [1.02, 2.27]). An additional analysis tested whether incompleteness increased the citation of hashtags related to university life. Still as expected, a one-way ANOVA (Identity Goal Completeness: complete vs. incomplete) confirmed that law students in the incomplete condition did not select more university-related hashtags ($M = 0.61$, $SD = 0.63$; bootstrap 95% CI [0.38, 0.86]) than those in the complete condition ($M = 0.69$, $SD = 0.61$; bootstrap 95% CI [0.50, 0.88]), $F(1, 65) = 0.31$, $p = .581$, partial $\eta^2 = 0.005$, $d = 0.14$.

In sum, Study 2 confirmed and partially extended Study 1's findings. Incomplete law students—exactly as incomplete medical students did in Study 1—engaged in self-symbolizing related to the identity goal of becoming the desired professional (e.g., a lawyer, a judge) by sharing on Instagram a comparatively higher number of photos with reference to that goal (e.g., pictures framing a formally dressed person at work, at the court, or seated at their desk with a judge's gavel on it). However, we only found a marginally significant small difference in participants' law-related text, with incomplete participants trending toward using more career-related words than complete participants to further compensate for their incompleteness.

Interestingly, self-symbolizing appeared to be strong and evident with respect to the first dependent variable (selected photographs), slight with respect to the second dependent variable (the written text) and absent with respect to the third dependent variable (the use of hashtags). According to the theory's predictions, then, since self-symbolizing is geared towards resolving incompleteness, we speculated that this progressive reduction in the effect of incompleteness on self-symbolizing efforts might have been caused by the gradual reduction of incompleteness feelings. Yet, as we had followed the natural sequence proposed by Instagram and did not randomize the order of the different self-symbolizing opportunities offered to our research participants, we are unable to conclude whether certain types of opportunities to self-symbolize are more intensively engaged in

by incomplete individuals or whether the urge to self-symbolize is reduced when an opportunity to engage in self-symbolizing had been seized. For future studies it seems important therefore that the order of the self-symbolizing opportunities offered is randomized; and this is what we did in Study 3 (see below).

Finally, participants' self-symbolizing efforts observed in the current study appeared to be specifically related to the domain to which the incompleteness concerns are related. Incomplete participants, in fact, while sharing comparatively more symbols related to their threatened career goal (e.g., becoming a lawyer), did not appear to increase their non-pertinent self-symbolizing (i.e., sharing of university-related symbols).

Study 3: Medical students self-symbolize only when their incompleteness relates to their identity goal

Self completion theory states that only the interaction of (a) commitment to a self-defining goal, and (b) the experience of incompleteness about that very goal should cause people to engage in compensatory self-symbolizing—the augmented sharing of identity-goal related symbols aimed at restoring respective completeness. It follows that students' feelings of incompleteness related to a career goal they do not aspire to (e.g., medical students receiving negative law-related feedback), should *not* increase the sharing of identity goal-related symbols (i.e., medicine-related symbols). Conversely, as we demonstrated in Studies 1 and 2, students who feel incomplete regarding the self-defining domain to which they feel highly committed (e.g., medical students receiving negative medicine-related feedback) should increase pertinent self-symbolizing behaviors on Instagram.

Study 3 tested this broader hypothesis with a sample of medical students committed to becoming good medical doctors. The experimental procedure included two manipulations. We varied (a) goal completeness as we did in Studies 1 and 2 (i.e., complete vs. incomplete), and (b) the type of goal to which the completeness/incompleteness manipulation was referring to (i.e., medicine vs. law related identity goal). Specifically, we gave medical students one of four types of feedback: Negative feedback related to medicine; negative feedback related to law; positive feedback related to medicine; or positive feedback related to law. We then measured the intensity of self-symbolizing by using the dependent variables of Study 2, this time with respect to medicine (choice of medicine-related pictures, words and hashtags), law (choice of law-related words and hashtags), and university life (choice of university-related words and hashtags). We hypothesized that only students who received negative feedback related to medicine should show enhanced medicine-related self-symbolizing behaviors on Instagram. Instead, medical students who received negative feedback regarding law, or positive feedback related to either medicine or law, should not engage in *any* compensatory effort, neither related to medicine (e.g., in a self-descriptive post selecting more medicine-related photos, words and hashtags), nor related to law (e.g., opting for more law-related words and/or hashtags), nor to any other domain (e.g., more university-related words and/or hashtags). In other words, we expected that only students incomplete in their area of goal commitment should show compensatory self-symbolizing, and this self-symbolizing should pertain to the domain of their identity goal and not beyond.

Notably, we focused on medical students to replicate and extend the effects found in Study 1, this time using an online procedure as was done in Study 2. We also added a measurement of self-esteem to check whether the effect of incompleteness on online self-symbolizing is moderated by the level of participants' self-esteem. As it is known from the literature (e.g., Brockner et al., 1987), self-esteem can interact with feedback manipulations and influence the effects of feedback on motivational and emotional states. Low levels of self-esteem, for instance, are known to produce demotivation when receiving negative feedback. By including a self-esteem measurement, we controlled for this possibility. According to the self completion theory, however, self-completion processes should not differ among people with high and low levels of self-esteem. Finally, we randomized the order of the self-symbolizing options offered to participants (i.e., the selection of pictures, the writing of a self-description, and the choice of hashtags). Proceeding this way, we aimed at undoing the effect of sequential self-symbolizing, allowing us to more critically compare the three forms of self-symbolizing with each other.

Method

Participants, design, and sample size determination

A total of 252 Italian medical students (75.0% females; M_{age} = 25.63 years of age, SD_{age} = 3.23) volunteered in a 2 (Goal Completeness: complete vs. incomplete) x 2 (Goal Domain: medicine vs. law) between-subjects experiment, in which three self-symbolizing measures served as the dependent variables. After data collection, we excluded 15 participants[8]; 11 of them admitted they were neither medical stu-

[8] Among the excluded participants, 2 were in the medicine-related incomplete condition, 4 in the medicine-related complete condition, 6 in the law-related incomplete condition, and 3 in the law-related complete condition.

dents nor at any stage of a medical career, and 4 completed the final part of the questionnaire (i.e., dependent measures) with inappropriate entries (nonsense or bad language, e.g., "dsjknjkns", "#???"). All students reported levels of commitment to becoming a physician equal or higher than the scale midpoint (i.e., on an 11-point scale ranging from 0 to 10; midpoint: 5; $M = 8.97$, $SD = 1.11$), while none of them reported levels of commitment to becoming a lawyer equal or higher than the scale midpoint (i.e., 5; $M = 0.25$, $SD = 0.75$). Therefore, our final sample amounted to 237 medical students[9] (75.9% females; $M_{age} = 25.55$ years of age, $SD_{age} = 3.27$; ranging from 18 to 38 years old). At the time of the study, the vast majority of our participants had an Instagram account (85.7%), and most of them indicated to use it often (15.2% almost continuously; 31.2% very often; 26.6% quite often; 13.5% rarely; and 13.1% never), as well as social networking sites in general (9.7% almost continuously; 36.7% very often; 46.8% quite often; and 6.8% rarely).

To estimate the needed sample size, we computed an *a priori* power analysis based on the smallest—and thus most conservative—effect size we found in the two previous experiments (i.e., Cohen's $d = 0.48$ in pairwise comparisons). Power calculations revealed that in order to detect main and interaction effects of at least $f = 0.24$ (i.e., $d = 0.48$) in a 2×2 between-subjects design, a total sample size of no less than 143 participants was required (statistical power 80%; $\alpha = 0.05$; one-tailed tests; numerator df 1; number of groups 4; non-centrality parameter $\lambda = 8.00$). We thus recruited a total sample of 252 medical students, from whom we needed to exclude 15 participants, obtaining a total sample of 237. With this sample size, the study had 80% power to detect a minimum effect size of $f = 0.18$ in 2×2 between-subjects designs (i.e., a *small* effect according to Cohen, 1988; $\alpha = 0.05$; one-tailed tests; number of groups 4; numerator df 1; non-centrality parameter $\lambda = 7.91$; see G*Power 3.1, Faul et al., 2007).

Procedure

The cover story was the same as used in Study 2. After participants gave their informed consent, they filled out a 15 min online survey composed of three parts. The first part assessed demographics, social media usage, commitment towards the relevant, self-defining goal of becoming a physician, commitment to the (irrelevant) goal of becoming a lawyer, and self-esteem. The second part entailed the psychological test we used in Study 2, and the feedback communication about participants' potential to work as a specific professional (i.e., physician or lawyer). Through this communication, we manipulated two factors: Goal completeness by giving positive or negative feedback (i.e., complete vs. incomplete, respectively), and the type of the goal by varying the domain of the feedback (i.e., medicine vs. law related identity goal). Finally, we assessed participants' self-symbolizing related to medicine (main dependent measure), law, and university life, by asking them to create an Instagram post to be published online, with the parts of this task presented in a randomized order. At the end, and regardless of whether participants completed the whole study, all of them were very carefully debriefed[10]. To reward their participation, participants who fully completed the survey were given the chance to take part in an online lottery and win 6€ Amazon bonuses.

Commitment questionnaire about becoming a physician and becoming a lawyer

We assessed participants' commitment to reach the goal of becoming a physician by asking three of the five questions we already used in Study 1 (e.g., *"How bad would it be if you could not become a physician after graduation?"*; Cronbach's $\alpha = 0.63$; 3 items). A parallel questionnaire assessed the commitment to pursue a law-related professional career. The questionnaire entailed the same three items we used for medicine-related commitment, but this time all referring to the goal of becoming a lawyer (e.g., "*How important is becoming a lawyer to you?"*). Answers were provided on an 11-point scale ranging from 0 (*not at all*) to 10 (*very much*); the mean of all the items represented the total level of commitment to becoming a lawyer (Cronbach's $\alpha = 0.68$; 3 items).

Self-esteem questionnaire

We assessed participants' self-esteem using a 2-item questionnaire. Items were created following the lead of previous studies' assessing self-esteem with one or two items only (e.g., Robins et al., 2001): "*Are you usually proud of yourself?"*; "*How much do you value yourself?"* ($r(235) = 0.84$, $p < .001$). Answers were provided on an 11-point scale ranging from 0 (*not at all*) to 10 (*very much*).

[9] At the time of the study, all participants were enrolled in medical schools of public or private Italian universities. This time, unlike Study 1, our medical students came from all parts of Italy (i.e., northern, central, and southern).

[10] Participants read a debriefing text that explicitly described how the negative/positive feedback was randomly assigned to participants. Also, we provided participants with the option to contact us via email/video-call and ask further questions at any time.

Manipulations of goal completeness and goal domain

To manipulate completeness with respect to the goal of becoming a specific professional, we applied the same negative/positive bogus feedback paradigm we used in Studies 1 and 2. Again, the online survey presented a psychological test (17 multiple-choice questions; e.g., *"Do you usually agree with people around you?"*), and, upon completion, gave feedback about participants' readiness to work as a specific professional. Furthermore, to examine the effect of incompleteness towards goals that participants did not feel committed to, we also varied the domain of the goal by giving feedback pertaining to either medicine or law. Depending on condition, participants received positive/negative feedback related to their readiness to become a physician (i.e., their actual identity goal, to which they were highly committed) *or* a lawyer (i.e., a non-pertinent goal, to which they were not committed at all): "*Your psychological readiness to become a physician/lawyer is below/above the national average for your age group. Specifically, the test showed that your psychological readiness to work as a physician/lawyer is at the 52nd /79th percentile"*.

Self-symbolizing measures

To measure medical students' self-symbolizing related to medicine, law, and university life, we used the procedures described in Study 2, this time with the set of photographs we tested in Study 1 (i.e., medicine vs. neutral photos; see Fig. 1). Further, in asking participants to create the anonymous Instagram multiple-photo post (see Study 2), we randomized the order of tasks: photos' selection, text entering, and hashtags citing.

Coding of the dependent variables (i.e., posted medicine pictures, and also medicine, law, university related texts and hashtags) was in line with Study 2. The set of pictures that participants were able to select consisted of 20 photos with explicit reference to medicine, 20 photos with similar subjects but *without* any reference to medicine, and 2 neutral photos. The final coding of this dependent variable equaled to the sum of all selected pictures related to medicine, with values ranging from 0 (no picture with reference to medicine) to 6 (all pictures presented some reference to medicine). To code the content of the written text (i.e., the brief self-description participants included in the post), we performed the same word analysis we ran in Study 2, using the Italian version of the Linguistic Inquiry and Word Count (LIWC) software (Alparone et al., 2004; Pennebaker et al., 2007). This time, we entered to the LIWC a medicine-related word list that was ad hoc created for this experiment (see Study 2 for the approach we used for the creation of the list), together with the law- and university-related word lists we used in Study 2. We thus obtained a LIWC medicine score, a LIWC law score, and a LIWC university score. Finally, we counted hashtags related to medicine (e.g., #medicaldoctortobe), law (e.g., #lawyerinanotherlife), and university life (e.g., #graduation). Again, the total number of either medicine, law, university related hashtags ranged from 0 (none of the selected hashtags was related to medicine/law/university) to 6 (all the selected hashtags were related to medicine/law/university).

In sum, the content of the Instagram multiple-photo post was translated into three main measures of self-symbolizing: (1) the number of medicine-related pictures selected by participants; (2) the reference to medicine/law/university contained within the text of the Instagram post, translated into LIWC scores (see Alparone et al., 2004; Pennebaker et al., 2007); and (3) the number of freely cited hashtags related to medicine, law, and university life. For all of these variables, higher numbers/scores are associated with higher domain-specific self-symbolizing.

Results and discussion

Preliminary analyses

Preliminary results revealed that the self-description text that participants wrote for the Instagram post did not differ in length among completeness conditions. We found that the total word count of complete participants ($M = 99.51$ words, $SD = 64.96$; bootstrap 95% CI [88.32, 110.90]) was comparable to incomplete participants ($M = 89.98$ words, $SD = 58.09$; bootstrap 95% CI [79.38, 100.77]), $t(235) = 1.19$, $p = .237$, $d = 0.16$. Consistent with Study 2, incompleteness did not lead to longer self-presentation. In addition, we found that, irrespective of whether the feedback was negative or positive, the word count of participants who received feedback related to medicine ($M = 101.73$ words, $SD = 66.66$; bootstrap 95% CI [90.29, 113.80]) was marginally higher than those who received feedback related to law ($M = 87.38$ words, $SD = 55.23$; bootstrap 95% CI [77.62, 98.58]), $t(235) = 1.79$, $p = .075$, $d = 0.23$. To interpret this result, we reason that medical students reading a questionnaire largely referring to law (i.e., asking law-related questions and offering law-related information) may have lost interest and thus created the text of the Instagram post with slightly less involvement than their counterparts. The goal domain and the completeness conditions did not interact, $F(1, 233) = 0.18$, $p = .670$, partial $\eta^2 = 0.001$. Finally, a one-way ANOVA confirmed that levels of self-esteem were comparable among randomized groups, $F(3, 232) = 0.81$, $p = .490$, partial $\eta^2 = 0.010$ (negative medicine feedback:

$M = 6.50$, $SD = 1.76$; bootstrap 95% CI [6.03, 6.90]; positive medicine feedback: $M = 6.53$, $SD = 1.92$; bootstrap 95% CI [6.07, 6.95]; negative law feedback: $M = 6.28$, $SD = 1.88$; bootstrap 95% CI [5.76, 6.77]; positive law feedback: $M = 6.07$, $SD = 1.93$; bootstrap 95% CI [5.58, 6.54]).

The interaction effect of goal incompleteness and goal domain on medicine-related self-symbolizing via Instagram

To test the hypothesis that incompleteness causes medical students to engage in compensatory self-symbolizing on Instagram only when such incompleteness refers to becoming a medical doctor, we ran a 2 (Goal Completeness: complete vs. incomplete) x 2 (Goal Domain: medicine vs. law related identity goal) ANOVA in which the number of posted photos related to medicine was the dependent variable. As expected, we found an interaction effect of goal completeness and goal domain on participants' posting of medicine-related pictures, $F(1, 233) = 7.04$, $p = .009$, partial $\eta^2 = 0.029$ (see Table 2 for all the descriptive statistics). As shown in Fig. 5 (Panel A), medical students who felt incomplete with respect to their identity goal—i.e., those who received negative feedback on becoming a physician—posted more medicine-related photos than any other group, $t(233) = 3.18$, $p = .002$, $d = 0.29$ (contrast weights: -1 -1 +3 -1); conversely, medical students who felt complete about becoming a physician—i.e., those who received positive medicine-related feedback—posted less medicine-related photos than any other group, $t(233) = 3.40$, $p = .001$, $d = 0.45$ (contrast weights: -3 +1 +1 +1) (see also Table 2).

We also conceptually replicated the main findings of Studies 1 and 2, reporting a large effect of incompleteness on the posting of medicine-related pictures among participants who read the medicine-related feedback, $t(124) = 4.11$, $p < .001$, $d = 0.74$. An *a priori* planned contrast analysis (contrast weights: -1 0 +1 0) confirmed this finding, $t(233) = 4.07$, $p < .001$, $d = 0.53$, demonstrating that our manipulation of completeness diminished compensatory posting of medicine photos when participants felt complete about their self-defining goal (i.e., when they learned to be ready for becoming a physician), and augmented such posting when they felt incomplete about that goal. By contrast, as predicted, we did not find a difference between complete and incomplete participants when the feedback referred to becoming a lawyer, $t(109) = 0.17$, $p = .862$, $d = 0.03$, proving that receiving feedback related to an identity goal that medical students are not committed to (i.e., a law-related identity goal) did not affect their self-symbolizing efforts; medical students who received law-related feedback in fact posted similar numbers of medicine photographs irrespective of whether the feedback was positive or negative (Fig. 5, Panel A).

We also tested whether within the incomplete condition, medical students who received feedback related to their self-defining goal (i.e., becoming a physician) posted more medicine pictures than those who read the law-related negative feedback. This difference, however, was small and did not reach statistical significance, $t(110) = 1.63$, $p = .105$, $d = 0.31$. Interestingly, within the complete condition, medical students who read medicine-related feedback posted less medicine photos than those who learned they would have a

Table 2 Medical students' self-symbolizing on Instagram as a function of manipulated goal completeness and goal domain in Study 3

			Goal Completeness	
			Complete	Incomplete
Pictures Related to Medicine	Medicine Identity Goal	*M (SD)*	2.02 (1.14)	2.89 (1.24)
		Bootstrap 95% CI	[1.72, 2.29]	[2.57, 3.18]
		N	65	61
	Law Identity Goal	*M (SD)*	2.45 (1.11)	2.49 (1.32)
		Bootstrap 95% CI	[2.16, 2.74]	[2.16, 2.85]
		N	60	51
Text Related to Medicine (LIWC Score)	Medicine Identity Goal	*M (SD)*	2.25 (1.91)	3.39 (2.63)
		Bootstrap 95% CI	[1.79, 2.72]	[2.77, 4.09]
		N	65	61
	Law Identity Goal	*M (SD)*	2.71 (3.29)	2.58 (1.99)
		Bootstrap 95% CI	[1.98, 3.63]	[2.07, 3.12]
		N	60	51
Hashtags Related to Medicine	Medicine Identity Goal	*M (SD)*	1.12 (0.91)	1.77 (1.20)
		Bootstrap 95% CI	[0.90, 1.35]	[1.48, 2.08]
		N	65	61
	Law Identity Goal	*M (SD)*	1.65 (1.04)	1.31 (1.05)
		Bootstrap 95% CI	[1.40, 1.90]	[1.04, 1.57]
		N	60	51

Note. The number of medicine-related pictures ranged from 0 to 6 pictures; the text related to medicine, as scored by the LIWC vocabulary analysis, ranged from 0 to 20; the number of medicine-related hashtags ranged from 0 to 6. Bootstrap estimates for 95% CI_s for the means were obtained with 5'000 resamples. N_s indicate the number of participants within each cell

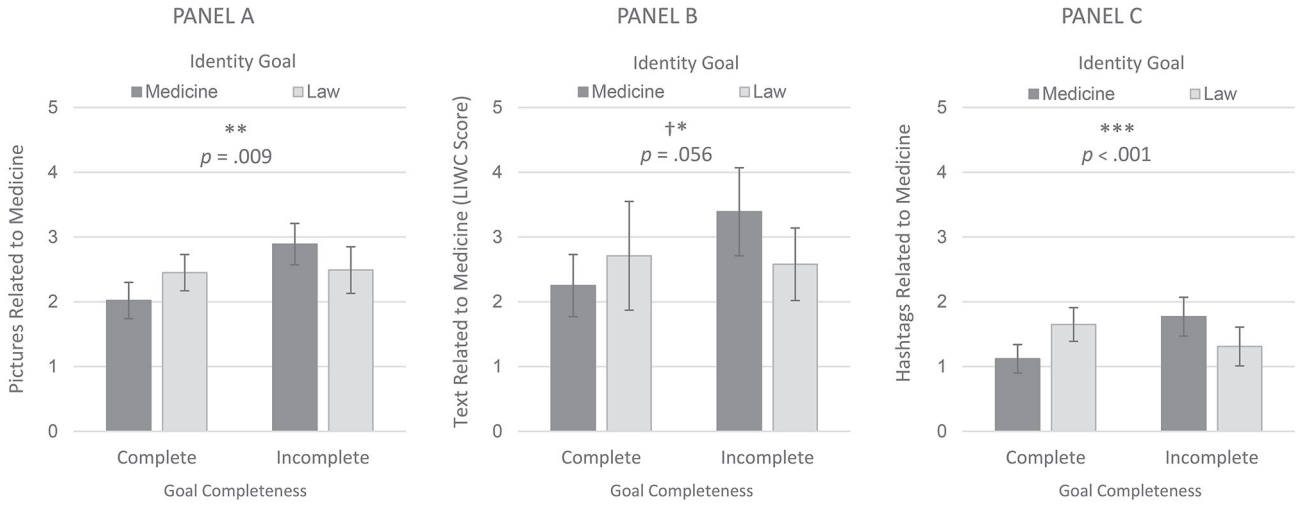

Fig. 5 Self-symbolizing efforts on Instagram shown by medical students in Study 3. *Note* Self-symbolizing efforts on Instagram (i.e., choice to post medicine-related pictures, text, and/or hashtags) shown by medical students in Study 3 depending on goal completeness (complete vs. incomplete) and the type of goal targeted by the completeness/incompleteness manipulation (law vs. medicine goal). The number of medicine-related pictures (PANEL A) ranged from 0 to 6; the text related to medicine, as scored by the LIWC vocabulary analysis (PANEL B), ranged from 0 to 20 (i.e., the maximum level observed for the LIWC 'medicine score' in Study 3); the number of medicine-related hashtags (PANEL C) ranged from 0 to 6. Higher numbers/scores of all the three dependent variables indicated that higher self-symbolizing related to medicine. Error bars represent 2 standard errors of the mean; p-values refer to statistical significance of two-way interactions

great readiness to become lawyers, $t(123) = 2.16$, $p = .033$, $d = 0.39$, suggesting that they were the only group who really felt reassured after the positive feedback.

The pattern of results for the self-descriptions written and posted by participants was similar to that observed for posted pictures. A 2 (complete vs. incomplete) x 2 (medicine vs. law goal) ANOVA with the LIWC medicine score as the dependent variable, revealed a marginally significant interaction effect of goal completeness and goal domain, $F(1, 233) = 3.69$, $p = .056$, partial $\eta^2 = 0.016$ (see Table 2). Again, medical students who felt incomplete about becoming a physician posted more medicine-related text than any other group, $t(233) = 2.34$, $p = .020$, $d = 0.31$ (contrast weights: -1 -1 +3 -1). However, in this case, the comparison between medical students who felt complete about becoming a physician and all the other groups was marginally significant, $t(233) = 1.75$, $p = .082$, $d = 0.23$ (contrast weights: -3 +1 +1 +1). As shown in Fig. 5 (Panel B), within participants who received the medicine-related feedback, we found that incompleteness augmented the frequency of medicine-related words in the posted self-description, $t(124) = 2.80$, $p = .006$, $d = 0.50$. This simple effect reached a medium effect size and conceptually confirms the results of Studies 1 and 2. A planned contrast analysis based on our main hypothesis (contrast weights: -1 0 +1 0) also supported this finding, $t(233) = 2.53$, $p = .012$, $d = 0.33$. Moreover, we did not find a difference between complete and incomplete participants when feedback referred to becoming a lawyer, $t(109) = 0.24$, $p = .813$, $d = 0.05$, suggesting that incompleteness about a non-pertinent goal (i.e., the goal of becoming a lawyer) did not affect self-symbolizing efforts of medical students. We also assessed other simple effects. We tested whether, within the incomplete condition, participants tended to write more medicine-related words when their incompleteness pertained to their identity goal of becoming a medical doctor; this effect, however, was small and only marginally significant, $t(110) = 1.81$, $p = .073$, $d = 0.35$. Similarly, within the complete condition, the simple effect of goal domain (medicine vs. law) on the LIWC medicine score was not significant, $t(123) = 0.96$, $p = .341$, $d = 0.17$ (see Fig. 5, Panel B).

Finally, we tested our main hypothesis with respect to the third self-symbolizing measure, the number of medicine-related hashtags. Results revealed the expected interaction effect of goal completeness (complete vs. incomplete) and goal domain (medicine vs. law related identity goal) on the number of medicine-related hashtags posted by participants, $F(1, 233) = 12.82$, $p < .001$, partial $\eta^2 = 0.052$ (see Table 2). Also in this case, medical students who felt incomplete about becoming a physician posted more medicine-related hashtags than any other group, $t(233) = 2.61$, $p = .010$, $d = 0.34$ (contrast weights: -1 -1 +3 -1), while medical students who felt complete about becoming a physician posted less medicine-related hashtags than any other group, $t(233) = 2.97$, $p = .003$, $d = 0.39$ (contrast weights: -3 +1 +1 +1). As depicted in Fig. 5 (Panel C), participants who received negative medicine-related feedback cited more medicine-related hashtags than those who received positive medicine-related feedback, $t(124) = 3.42$, $p = .001$,

$d = 0.61$, thus showing the same compensatory self-symbolizing we documented in both the previous experiments and in the current study with respect to pertinent self-symbolizing. A hypothesis-driven, planned contrast test (contrast weights: -1 0 +1 0) was also significant, $t(233) = 3.45$, $p = .001$, $d = 0.45$. Beyond our predictions, though, we found a marginally significant difference between complete and incomplete participants when feedback referred to becoming a lawyer (law-related identity goal), with medical students who received positive law-related feedback citing more medicine hashtags than students who received negative law feedback, $t(109) = 1.69$, $p = .093$, $d = 0.32$. Possibly, receiving positive feedback that suggests to a medical student that they could have a great career as a lawyer might indirectly imply negative feedback related to becoming a medical doctor. This difference, however, needs to be confirmed by future studies.

We also tested other simple effects. Within the incomplete condition, participants cited more medicine-related hashtags when such incompleteness was induced about their identity goal of becoming medical doctors, $t(110) = 2.12$, $p = .036$, $d = 0.40$. Within the complete condition, medical students who read medicine-related feedback posted less medicine photos than those who learned to have great potential for becoming a law professional, $t(123) = 3.02$, $p = .003$, $d = 0.54$, suggesting that they were the only group who really felt reassured after the positive feedback. Importantly, none of the reported effects of incompleteness on self-symbolizing posting was moderated by participants' self-esteem.

In the current experiment we randomized the order of type of self-symbolizing offered to avoid the effects of sequential self-symbolizing we had observed in Study 2. With respect to the simple effect of medicine-related incompleteness on medical students' self-symbolizing, in Study 3 we indeed found effect sizes that were comparable among the three different types of self-symbolizing (i.e., all attesting to medium-to-large effects, ranging from $d = 0.50$ to $d = 0.74$), with photographs and hashtags showing the biggest effects (d_s of 0.74 and 0.61, respectively). Regarding the potential effect of sequential self-symbolizing activities, then, we conclude that it is possible that the order we used for assessing dependent measures in Study 2 (pictures, text, and, lastly, hashtags) caused law students to progressively increase feelings of completeness, and thus decrease consequent self-symbolizing, showing the highest self-symbolizing efforts when selecting pictures ($d = 0.87$), comparatively less self-symbolizing efforts when writing the self-description ($d = 0.48$), and almost absent efforts when citing hashtags ($d = 0.14$).

Incomplete medical students do not engage in law-related or university-related self-symbolizing

To explore the specificity of compensatory self-symbolizing efforts of incomplete medical students and replicate the results of Study 2, we repeated the above analyses considering measures of non-pertinent self-symbolizing as the dependent variables (i.e., university- and law-related sharing of symbols through posted text and hashtags). We expected that incompleteness feelings about an aspired-to career goal (e.g., becoming a medical doctor) should not enhance nor decrease non-pertinent self-symbolizing on Instagram. The same absence of differences was expected for medical students receiving feedback not related to their identity goal (i.e., becoming a lawyer). In line with our predictions, 2 (complete vs. incomplete) x 2 (medicine vs. law related identity goal) ANOVAs did not reveal any interaction effect of goal completeness and goal domain on measures of university-related self-symbolizing, neither with respect to the use of university-related words (LIWC university score), $F(1, 233) = 0.23$, $p = .632$, partial $\eta^2 = 0.001$, nor with respect to the citation of hashtags related to university life, $F(1, 233) = 1.44$, $p = .232$, partial $\eta^2 = 0.006$. As expected, we also found no interaction effect of goal completeness and goal domain on law-related words present in the text (LIWC law score), $F(1, 233) = 0.09$, $p = .771$, partial $\eta^2 < 0.001$. Overall, in line with the specific interests of our participants (all medical students), a repeated-measure ANOVA revealed a clear difference between university-related text and law-related text, with LIWC university-related scores being higher than the LIWC law-related scores, regardless of the manipulations' conditions, $F(1, 248) = 148.62$, $p < .001$, partial $\eta^2 = 0.375$. No interaction effect between the manipulations and the self-symbolizing domain (law vs. university) was found. We could not run any analyses regarding the citing of law hashtags, since none of our medical students ever cited a law-related hashtag in their Instagram post (e.g., #lawyerinanotherlife, #medorlaw).

In sum, the current results confirm our hypotheses, replicating and extending the findings of Studies 1 and 2. Incomplete students engage in specific self-symbolizing when their incompleteness is related to the identity goal of becoming the aspired-to professional, by sharing on Instagram a comparatively higher number of photos with reference to that goal (e.g., pictures framing medical scrubs), a more career-centered self-description (e.g., "I will be a cardiologist"), and a higher number of goal-related hashtags (e.g., #med, #physiciantobe, #cardioteam). By contrast, feeling incomplete about a goal that is not self-defining for the student makes no difference to them.

General discussion

We predicted and found that university students who sense incompleteness with respect to their aspired-to career goal do engage in compensatory self-symbolizing on Instagram by posting more symbols related to their future career. This compensatory self-symbolizing is identity-specific as the posted compensatory symbols are related to the aspired-to career (i.e., physician or legal profession) and not to other non-relevant domains (e.g., university life). Also, we demonstrated that incomplete students engage in compensatory self-symbolizing only when their incompleteness pertains to their aspired-to and not to an irrelevant identity goal (e.g., for medical students, becoming a physician but not a legal professional).

The reported effects may be generalized to any population of university students and aspiring professionals independent of their specific career goal or social class, for at least two reasons. First, we obtained evidence for the above effects consistently across two different career goals and across different social backgrounds, since students in Study 1 were enrolled in a private university of Milan, while all students in Study 2 and the vast majority of those in Study 3 came from public universities of the northern, central, and southern Italy. Second, numerous studies already addressed student populations for testing SCT's predictions and demonstrated that self-symbolizing efforts are observed as a consequence of incompleteness feelings no matter which specific career goal these feelings referred to. For instance, compensatory self-symbolizing was found with psychology students (e.g., Gollwitzer et al., 2009, Studies 1 and 3), law students (e.g., Gollwitzer et al., 2013; Gollwitzer et al., 2009, Studies 2 and 4; Marquardt et al., 2016, Study 2), business students (e.g., Marquardt et al., 2016, Study 1), and high school seniors (e.g., Marquardt et al., 2016, Study 3).

Most importantly, the present results may also generalize to people with *non*-professional identity goals. As self-symbolizing is a basic motivational process that regards individuals in general, there are no theoretical reasons to expect these effects to only occur in specific populations. In support of this assumption, self-symbolizing effects have been documented within populations not related to university life or specific professional fields (e.g., "green" buyers, Longoni et al., 2014; athletes and gym users, Coraini & Pantaleo, 2004).

Our results support a self-completion explanation for social media posting behaviors, demonstrating that social networking sites can be easily used for engaging in specific, compensatory self-symbolizing aimed at restoring incomplete identity goals. At the same time, while our findings are consistent with other self-related theoretical conceptualizations, they imply that relying solely on a uses and gratification (U&G) explanation or a self-affirmation perspective might be overly general and, consequently, unsuitable to predict individuals' specific posting of self-related content (e.g., career-related symbols) on social media platforms in response to identity-relevant negative feedback. According to self-affirmation theory (Steele, 1988), for instance, when students receive threatening information regarding their readiness to work as competent professionals, they are likely to apply various strategies to restore a general positive self-evaluation. One such strategy might involve emphasizing achievements in domains unrelated to the area impacted by negative feedback. For example, medicine students could restore self-esteem by showcasing accomplishments tied to other aspects of their identity, such as those associated with university life (e.g., Sherman & Cohen, 2006, for a review). By contrast, the present studies demonstrated that identity-goal incompleteness does not seem to induce compensation in fields unrelated to the threatened identity goal (e.g., university life). Incompleteness solely enhances the self-symbolizing that is related to the professional area students feel incomplete about, thus orienting their posting towards specific goal-related symbols able to restore their incomplete identity goal (e.g., becoming a physician). In other words, compensatory self-symbolizing is always *domain*-specific while self-affirmation does not have to be. This specificity is predicted and fully explained by SCT principles.

It is important to note, however, that the three theories we mentioned—self-completion theory, self-affirmation theory, and uses and gratification theory—are by no means in contradiction with each other. The need for self-worth and the need for completion, for instance, may even appear to cause similar effects when it comes to presenting oneself to an audience or posting self-related content online. They just pertain to different processes that may lead to different implications for predicting people's behavior, such as the specificity of the content one is driven to post in response to these needs. As for the uses and gratifications approach (U&G; Katz & Blumler, 1974), it is not in contradiction with any of the previous theories. U&G, however, leads to very general predictions about social media posting. It postulates that an individual is driven to use again a specific social media if this helped satisfy their needs in the past and, in this sense, the needs that could attract users could be the most diverse, including self-affirmation, self-completion, and many others (e.g., entertainment). Therefore, the U&G framework can be better conceptualized as a superordinate theory: It can guide future research towards more general expectations on social media use but not predict the posting of specific self-related content.

Another important consideration is that our results, rooted in self completion theory (SCT; Wicklund & Gollwitzer,

1982), provide substantial support to SCT while remaining *consistent* with other self-related theories and conceptualizations, including more recent ones. For instance, it is worth noting the potential overlap between symbolic self-completion and the maintenance of contingent self-esteem (e.g., Crocker & Wolfe, 2001; Crocker & Knight, 2005). According to Crocker and colleagues' theorization on the maintenance of contingent self-esteem (see Deci & Ryan, 1995; Kernis, 2003; Kernis & Waschull, 1995, for definitions and the early theoretical framework), people want to succeed and avoid failures in domains of contingency—domains in which the individual believes they must succeed to feel worthy and valuable. The more people's self-esteem is contingent on a specific domain (e.g., medicine-related career), the more their self-esteem increases when experiencing domain-specific successes and decreases when experiencing domain-specific failures. As a result, individuals undertake specific self-regulation efforts to maintain and elevate their self-worth, striving to achieve success and prevent failure within the domains that are at the basis of their self-esteem. Additionally, they apply self-validation strategies linked to their specific domains of contingent self-esteem, aiming not only to succeed but also to prove their success within these particular domains (Crocker & Park, 2004, 2012). The domain-specific behaviors that stem from the need for contingent self-worth could include the increase of the posting of career-related content on Instagram we observed in our studies. The distinction—as well as the commonalities and overlaps—between symbolic self-completion and the maintenance of contingent self-esteem warrants further exploration.

Finally, one may think that the augmented identity-related posting we observed in participants who received negative feedback could be due to a priming effect (e.g., Weingarten et al., 2016; Chen et al., 2021). According to such an alternative explanation, a negative communication about one's readiness to pursue an aspired-to identity leads to a stronger activation of relevant content. As a result, the activated contents related to the desired identity (e.g., physician, legal professional) may have prompted our participants in the incomplete condition to share more identity-related posts, leading to the results shown. This explanation, however, is excluded by one of the main principles of SCT and has been already confuted by previous research on self completion. According to SCT, negative feedback should induce people to increase their self-symbolizing *in particular* when a social reality is present—when other people are watching or are assumed to be watching (e.g., when Instagram posts are expected to be viewed by others). Previous findings supported this prediction and showed that the absence of a social reality makes self-symbolizing efforts disappear (e.g., Gollwitzer et al., 2009). This means that the augmented self-symbolizing posting we reported in our experiments would likely have disappeared if we had told participants that their posts were not viewable by others. Overall, this kind of evidence distinguishes self-symbolizing effects from priming effects.

Implications for the study of social media behavior and self-completion processes

Given that identity goal completeness can be pursued through social media posting has important implications for the study of social media behavior, as it leads to more plausible explanations for many social media-specific phenomena. Our findings, for instance, can help explain what is called the 'post it or it didn't happen' phenomenon (e.g., Silverman, 2015). In some situations, usually when they have just achieved a goal or are in the middle of doing something that is relevant for their identity, social media users feel like they should take a picture of what is happening (or write a brief statement about it) and *post it*, as soon as possible. Otherwise, if they do not do so, they may feel that the event has not really happened. Thanks also to the advent of Social Media Stories[11] (Choi et al., 2020; Bayer et al., 2016), this phenomenon is increasingly spreading to the point of becoming part of users' everyday life, just like the use of social networks itself. The present research provides fundamental theoretical insights for explaining such a specific phenomenon and may help to prevent its consequences.

The present research has also implications for furthering the study of SCT and its derivations. First, we demonstrated for the first time that compensatory self-symbolizing is possible through computer-mediated communication, such as by including a specific hashtag in an Instagram post (e.g., #medstudent). As a derivation, we suggest that people pursue self completeness not only by acquiring and showing off symbols of goal attainment but rather by collecting *pieces of communication* that demonstrate to others the alleged possession of the aspired-to identity (e.g., medicine emoticons and hashtags in the biography). In this sense, social networking sites like Instagram seem to have ideal characteristics for self-symbolizing: They not only provide a showcase to register one's symbols on others but also keep that showcase always available over time, allowing for a collection of symbols that is literally made up of these pieces of communication (i.e., hashtags, photos, comments, emoticons, etc.). Every element of this collection can serve

[11] Social Media Stories are a tool for sharing ephemeral content that expires in 24 h. Posting such a story means publishing a very short video, or a few-seconds showing an image or short text that disappears after a day and generally tells others of thoughts and happenings at the very moment they are happening (Bayer et al., 2016).

as a symbol of attainment by conveying the message that the person is complete towards a specific identity goal; and this is possible with little or no effort (e.g., by just adding a little stethoscope emoticon right after one's profile name). For this reason, social media sites are not just means among others to communicate the possession of certain symbols that validate a given self-definition, but a source of symbols themselves where any posted content can be an implicit sign of possessing a certain identity, exactly like—or even more effective than—material possessions and other symbols in traditional self-symbolizing occasions (see Wicklund & Gollwitzer, 1982).

Second, as social media communication is itself a form of self-symbolizing and can be easily engaged in by users, using social media for self-completion enables people to directly *control* the possession of their symbols through the modification of their communication (in this regard, see also the perspective of symbolic interactionism, e.g., Brake, 2012; Carter & Fuller, 2016). They can repeat their posting of symbols, change them over time, or even engage in 'like-seeking' false self-presentation—a phenomenon that is common on social media (e.g., Dumas et al., 2017; Utz, 2005). For instance, social media self-symbolizers can accentuate the attention on specific features, distort the narrative of specific events, boast of attributes they do not really have, or even share false information. This leads to new research questions regarding self-completion processes and trust. For example, if people do not trust social media, is their online self-symbolizing still effective? Also, since self-symbolizing makes people act impulsively (Gollwitzer & Wicklund, 1985), they may reflect less on the truthfulness of online content, allowing them to produce distorted/fictitious content and believe/share others' content without hesitation. This would fuel a vicious cycle that could have important implications for online behavior (e.g., the sharing of fake news).

Further, we demonstrated that compensatory self-symbolizing is possible even in the absence of others, by addressing the unlimited virtual audience provided by social networking sites. Therefore, social media are an unlimited source of social reality, a showcase on which users can register their symbols of completeness at any time and without needing to actually meet people. As soon as they need to do so, incomplete users can post on social media any proof of having the aspired-to identity and feel complete again (see the 'blackboard' concept, Wicklund & Gollwitzer, 1982; Gollwitzer, 1986). Thus, taken together, all the above arguments qualify social media as an always-at-hand '*self-symbolizing tool*': An easily accessible application that enables anyone with a smartphone or a computer to pursue identity goal completeness at any time and without much effort.

Potential consequences of using social media for self-symbolizing

The discovery that social media can be used to compensate for incompleteness in identity goal pursuits may help to explain and predict some specific consequences of social media use, such as procrastination (e.g., Hinsch & Sheldon, 2013). More specifically, explaining social media posting in terms of SCT could make professionals want to prevent the potential negative effects of online self-symbolizing. According to SCT principles, in fact, when completing their identity goal symbolically via social media, people should experience a substantial reduction of the motivational energy destinated to reach their goal due to their restored feelings of completeness—an energy that is dearly needed for facing the challenges that their long-term identity goals entail (e.g., passing exams to pursue the goal of becoming the desired professional). Self-symbolizing on social media, for instance, might make medical or law students feel that the goal of becoming a physician or law-related professional is in their reach, leading them to study less, avoid refresher courses, or fall prey to distractions during the more painful work with actual patients or clients. Such downstream negative effects of self-symbolizing on goal striving have been demonstrated in studies on the reduced motivation to engage in identity-related activities such as the identity goal of acting green (e.g., Longoni et al., 2014; Lalot et al., 2019).

Looking at online behaviors through the lens of SCT may lead professionals to also prevent further negative effects of self-symbolizing, such as the neglect of others' perspectives (Gollwitzer & Wicklund, 1985). Like any other goal-oriented behavior, compensatory self-symbolizing is driven by an implementation orientation which puts the person in an egocentric state that is functional for goal attainment. Therefore, self-symbolizing individuals may primarily focus on demonstrating to others that they possess the aspired-to identity, irrespective of others' perspectives, emotions, alternative goals and needs. In this sense, self-symbolizers use others just like a blackboard—an opportunity to register the possession of an identity goal-relevant symbol (Gollwitzer, 1986; Wicklund & Gollwitzer, 1982). On Instagram, for example, incomplete medical students could restore completeness by sharing a photograph of themselves in a white coat while receiving a vaccine, apparently being a good model. However, if the students' ultimate goal is reestablishing completeness regarding the self-defining goal of becoming a medical doctor, it is possible that they will focus only on letting others know about acquired identity goal-related indicators of completeness—without really considering others' perspectives. They will thus neglect possible questions that other users might have and forget to read the

received comments regarding their posts, thus missing the opportunity to help Instagram users to understand why getting vaccinated is so important.

According to a different theoretical conceptualization that is in full accordance with self completion theory, this phenomenon can also be viewed as a reduction of 'multiple perspectives'—a reduced openness to others' points of view (see the theory of multiple perspectives; Wicklund, 1999; Pantaleo and Wicklund, 2001). In such a psychological state, cognitive consistency and concreteness dominate, with open-mindedness becoming narrowed to those elements of the environment that are strictly relevant to one's goal striving (see also Easterbrook, 1959). In any goal implementation state, including self-symbolizing, other people will thus be respected only when representing obstacles or facilitators to goal attainment (Pantaleo, 1997). This unwanted potential consequence is expected to interfere with the complex work of advanced professionals (e.g., medical doctors or lawyers) but can be ameliorated by the theoretical guidance of SCT (e.g., detecting and resolving incompleteness feelings).

Although online self-symbolizing may have negative effects on social media users' social interactions or motivational energization, we would never want to give the impression that it is exclusively negative, or something to avoid or blame. First, online self-symbolizing is good for reaching completeness feelings and their positive effects. Feeling complete about a career identity goal, for example, enhances self-confidence before professional performances (e.g., public speaking). It also helps the individual "stay in the field", thus enhancing the probability to eventually achieve their professional goals in the long run (see Gollwizter & Kirchhof, 1998). Second, posting identity symbols is a sign that the individual does *care* about their identity goals. Failures, weaknesses, and shortcomings are normal in the pursuit of a long-term goal, but only highly committed individuals react with self-symbolizing and try to restore completeness. Thus, collecting self-defining symbols to demonstrate the possession of an identity is a sign of commitment towards an aspired-to identity goal (Wicklund & Gollwitzer, 1982).

Limitations and future directions

When providing three different routes to self-symbolizing on Instagram in a non-randomized order in Study 2, students appeared to engage less in the subsequently offered forms of self-symbolizing. In other words, we accidentally found data that are coherent with the hypothesis that online self-symbolizing is effective in reducing the need for more self-symbolizing over time, that is, over further occasions for self-symbolizing. However, Study 2 involved a reduced sample size that does not permit us to conclude on subsequential self-symbolizing. Also, even though we enrolled more participants and randomized the three opportunities of Instagram posting in Study 3, our third experiment was not designed to study the effects of the previous sharing of symbols on subsequent use of occasions for self-symbolizing. Future studies could thus consider the presented interpretation and design a study that manipulates the availability of many occasions for self-symbolizing and measures the effects of achieved self-completion over time and across multiple occasions for self-symbolizing.

A second limitation of our studies regards the absence of manipulation checks. We did not implement any manipulation checks for our incompleteness manipulations for precise reasons. Asking incomplete participants about their completeness gives them the possibility to restore completeness by stating they are complete. For this reason, when implemented after bogus-feedback-based inductions, self-report measures of incompleteness as manipulation checks are both useless and counterproductive, as they (a) are not valid measurements of incompleteness, and (b) may absorb the effect of the manipulation. Similarly, asking participants to report the degree they believe the bogus feedback gives them the chance to reduce incompleteness by stating they do not believe in it at all. Again, this may weaken the strength of the manipulation, without constituting a valid measure of participants' beliefs. Following the lead of previous studies adopting similar bogus-feedback-based incompleteness inductions (e.g., Lalot et al., 2019, Studies 3 and 4; Longoni et al., 2014; Marquardt et al., 2016, Experiments 1 and 2), we thus decided not to implement any manipulation checks in our studies. As the measurement of incompleteness after bogus feedback manipulation has always been a problem in SCT research, future studies are encouraged to develop and validate implicit measures of (in)completeness that could go beyond this problem—assessing, for example, the perceptual and cognitive side effects of incompleteness feelings (Sciara et al., 2022).

Another limitation regards the ecological validity of our operationalization of social media use. In creating a real Instagram profile (Study 1) or assembling content to be posted on Instagram (Studies 2 and 3), we indeed asked participants to post pictures framing people they should identify with (e.g., actual medical students) but that did not frame themselves. Thus, even if accompanied by a self-descriptive caption with related hashtags, in which they evidently reported personal experiences and perspectives, our participants posted pictures of strangers. We decided to use this non-ecological operationalization of Instagram photos' posting for many reasons. First, measuring participants' real posts was impossible for privacy and ethical reasons (e.g., many Instagram profiles are private, and ethical problems exist also when registering content posted from public profiles; also,

most Instagram users publish just a few pictures per month, and it is unwanted for the effects of negative feedback to last for days or even weeks). Second, registering participants' posting of their actual pictures was unsuitable for validity reasons (e.g., participants needed to start from the same set of pictures; also, participants' posts needed to be *a priori* classified as entailing reference to medicine or not). Third, social media users enormously differ in posting behaviors, with their posting habits and criteria depending on various stable characteristics (e.g., some people post continuously while others post a few pictures per year, even if both use social media each day to witness others; some people are used to post themselves, while others only post relevant objects and/or landscapes). Making participants post a fixed number of photos from a given set of preselected pictures enabled us to reduce such variability.

Instead of asking participants to post pictures of themselves, we thus asked participants to use pictures of others to express themselves. Such an approach is not uncommon on social media. For instance, the use of avatars (i.e., graphical content that represents the self) hides the users' identity but still permits them to sincerely express themselves (e.g., via written anonymous posts; Belk, 2016; Dunn & Guadagno, 2012; Bailenson et al., 2008; Bailenson & Beall, 2006). Moreover, in our experiments, we explicitly asked participants to post the pictures they most identified with. However, future studies on SCT will need to design and implement more ecological procedures that could both measure participants' real use of social media sites, fixing the problems referred to above. The use of closed groups on social media like Facebook could offer a viable direction to go, as they provide a confined online environment in which experimental variations can be easily implemented, and users' posting behaviors can be stimulated by instructions and accomplices (e.g., Sciara et al., 2021).

Conclusion and outlook

Based on symbolic self completion theory (SCT), we demonstrated that feeling incomplete about identity goals makes Instagram users post self-symbolizing content to restore completeness. The presented research not only supports and extends SCT but also opens up new ways for testing its predictions. Future research could profitably use social media as a context/instrument to disentangle controversial issues or answer open questions regarding SCT, such as the role of the use of subsequent opportunities for self-symbolizing, the completeness inducing power of different kinds of symbols and audiences, the comparison of social media versus other traditional means for self-symbolizing, the effects of striving for different identity goals at the same time, or the unfolding of the compensation process starting with sensing incompleteness to choosing and implementing possible routes to restoring completeness. In this sense, social media contexts represent an ideal social setting for new creative research on self-symbolizing that helps develop symbolic self completion theory.

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Data Availability The research materials used in the present studies are available from the corresponding author upon request. The data that support the findings described in the paper are available at Open Science Framework (OSF): https://osf.io/rvx5p/?view_only=50b178044fca4221a731579bf755dc3d.

Declarations

Ethics approval The research procedures have been officially approved by the Ethical Committee of Catholic University of the Sacred Heart of Milan in December 2019.

Consent to participate Informed consent was obtained from all individual participants included in the studies.

Competing interests The authors have no competing interests to declare that are relevant to the content of this article.

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