



An Evaluation of the Transparency and Overall Quality of Evaluation at the Swiss National Science Foundation:

Final Report

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Foreword

This report — *An Evaluation of the Transparency and Overall Quality of Evaluation at the Swiss National Science Foundation: Final Report* — was prepared for the Swiss National Science Foundation (SNSF) by staff, faculty, and students of Western Michigan University's (WMU) Evaluation Center (EC), Interdisciplinary Ph.D. in Evaluation (IPDE), and Evaluation, Measurement, and Research (EMR) programs. Included in the report are an executive summary, a brief background and introduction to the evaluation, complete descriptions of the methods used to execute the evaluation, and detailed findings and conclusions related to each of the focal evaluation questions and subquestions. The report concludes with recommendations for improving both the transparency and overall quality of evaluation at the SNSF.

All phases of the evaluation, including contracting, planning, design, execution, and reporting, were guided by the United States *The Program Evaluation Standards* (Joint Committee on Standards for Educational Evaluation, 2011), American Evaluation Association *Guiding Principles for Evaluators* (American Evaluation Association, 2004) and the Swiss Evaluation Society (SEVAL) *Evaluation Standards of SEVAL* (Swiss Evaluation Society, 2000). This evaluation is compliant with and was approved by WMU's Human Subjects Institutional Review Board (HSIRB).

The cover page of this report was inspired by the SNSF's *Annual Report: 2011* (Swiss National Science Foundation, 2012a), in which the evaluation was described as putting the SNSF “under the microscope” (Swiss National Science Foundation, 2012a, n. p.).

The views and opinions expressed in this report are those of the authors and do not necessarily reflect those of the SNSF. Any errors of fact or interpretation are the exclusive responsibility of the authors.



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Executive Summary

The intended uses of this evaluation are both formative and summative. They include instrumental applications, where evaluation results could directly change the SNSF; conceptual uses, where results might indirectly change the SNSF through learning; and symbolic uses, which are purely for signaling purposes that produce no immediately observable changes within the SNSF.

Background and Introduction

The evaluation of the overall quality and transparency of evaluation at the SNSF was guided by six focal evaluation questions that were grouped into subcategories of questions related to (1) structures and environments, (2) targets, criteria, guidelines, and procedures, (3) transparency and comprehensibility, and (4) impacts. In total, 32 questions were addressed by the evaluation. The six focal questions were:

1. To what extent do the SNSF's evaluation procedures and their execution promote excellent research in all disciplines?
2. To what extent do the SNSF's evaluation procedures and their execution support research that is both scientifically relevant and original?
3. To what extent do the SNSF's evaluation procedures and their execution increase the competitiveness of Swiss research and researchers in Switzerland?
4. To what extent do the SNSF's evaluation procedures and their execution encourage the work of junior researchers?
5. To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation procedures are fair and unbiased?
6. To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation decisions are transparent and comprehensible to applicants?

Methods

A utilization-focused approach was used to evaluate the overall quality and transparency of evaluation at the SNSF. The primary intended users of the evaluation are the SNSF Foundation Council (FC), the SNSF National Research Council (NRC), and the SNSF Secretariat.

Methodologically, a concurrent mixed method design, giving equal priority to both quantitative and qualitative methods, was employed. Conclusions and recommendations are based on analyses of (1) a survey of FC members, (2) a survey of applicants, (3) a survey of external expert reviewers, (4) extant data, (5) semi-structured interviews with members of the NRC and Secretariat, and (6) SNSF documents. Quantitative information sources included internet-based surveys of relevant SNSF actors and key informants (i.e., 20 FC members, 243 funding applicants, and 222 external reviewers) and SNSF extant data on 26,418 applications from 2006 through 2011. Qualitative information stemmed from 99 semi-structured interviews with relevant SNSF key informants, 45 relevant documents (SNSF policies and procedures, guidelines and external and internal reports), and open-ended survey responses. In total, excluding extant data and documents, more than 500 SNSF actors and key informants participated in the evaluation.

Findings and Conclusions

Overall, the SNSF is meeting its objectives. The SNSF is exceptional at recruiting and retaining qualified people, although the processes for doing so are not always transparent. Additionally, the structure, organization, and division of tasks within the SNSF contribute to the goals of the SNSF. Further, communication between various groups and bodies is strong, yet flexible.

With respect to targets, guidelines, criteria, and processes, the SNSF application evaluation process is relatively free from bias, although there are clear areas of concern for certain groups of applicants. The findings with respect to accessibility of application guidelines and related documentation are positive, but the evaluation process and criteria remain somewhat opaque to the SNSF's audience of researchers. The current set of funding schemes is generally responsive to the needs of Swiss researchers, but some areas of misalignment are evident.

Transparency and comprehensibility of application evaluations are mixed, largely driven by structural difficulties in the external review system. While the external review process at the SNSF functions well most of the time, it causes difficulties for referees in certain instances, which bring about a disproportionate amount of effort. Occasionally, poor quality external evaluations of applications also place some limits on the quality of feedback to unsuccessful applicants, and a majority of applicants report that funding decisions are not well understood.

Regarding impact, the current funding schemes mostly meet existing demands. However, funding decisions are complex and vary widely by division. Systematic biases associated with gender, age, type of application (i.e., new applications versus continuation or 'follow-up' applications), and institution types (i.e., ETH [federal institutes of technology], Fachhochschule [universities of applied sciences and teaching universities], Kantonale [cantonal universities], and Andere ['other' types of institutions]), based on analyses of the SNSF's extant data on applications, are small but statistically significant.

Overall, it is evident that the SNSF consistently funds excellent research, but if workload (particularly for referees) continues to increase without adaptation, there will arise a point of trade-off between quality and quantity. Moreover, transparency at the SNSF is an area where improvements could be made. While most applicants do not contest the SNSF's decisions, a majority of applicants indicate a lack of clarity and understanding of the reasoning behind decisions. Similarly, processes of nomination and selection for positions in the NRC and its commissions are unclear.

Recommendations

Based on the findings and conclusions, the following recommendations are intended to help improve the transparency and overall quality of evaluation at the SNSF:

1. Reform the processes and procedures for external evaluations of funding applications.
2. Calibrate external reviewers.
3. Distribute the work between the NRC and the Secretariat to better meet future demands.
4. Provide for the direct rejection of applications for project funding in all divisions of the NRC.
5. Provide compensation for external reviewers.
6. Improve the documentation and guidelines for applicants, so that evaluation criteria, procedures, and decision-making processes are clearly delineated and transparent.
7. Conduct regular, systematic reviews and possible revisions to funding instruments.
8. Review and clarify selection procedures for NRC membership.

Background and Introduction

The primary purpose and intended use of the evaluation is improvement-oriented (i.e., formative); that is, intended to provide information useful for improving the transparency and overall quality of evaluation at the SNSF. Even so, the evaluation may also serve certain summative functions and uses (i.e., accountability) related to the transparency and overall quality of evaluation at the SNSF.

Under the Microscope

Internationally, a wide variety of policies and procedures have been used for funding research by national grant-making foundations and similar organizations (Coryn, 2007; Coryn, Hattie, Scriven, & Hartmann, 2007; Coryn & Scriven, 2008; Guena & Martin, 2003; Frankel & Cave, 1997). Simultaneously, demands for improved grant making and accountability have increased substantially (Stufflebeam & Coryn, 2012; Trochim, Marcus, Mâsse, Moser, & Weld, 2008). These demands, driven by a multitude of factors (e.g., increasingly scarce resources, increased competition, pressures to improve performance), have placed a great burden on grant-making foundations not only to continuously improve their overall effectiveness, but also to account for their activities and expenditures (Eckerd & Moulton, 2011; Herman & Renz, 2008; Martz, 2012).

Guiding Evaluation Questions

The evaluation of the transparency and overall quality of evaluation at the SNSF was guided by six focal evaluation questions:

1. To what extent do the SNSF's evaluation procedures and their execution promote excellent research in all disciplines?
2. To what extent do the SNSF's evaluation procedures and their execution support research that is both scientifically relevant and original?
3. To what extent do the SNSF's evaluation procedures and their execution increase the competitiveness of Swiss research and researchers in Switzerland?
4. To what extent do the SNSF's evaluation procedures and their execution encourage the work of junior researchers?

5. To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation procedures are fair and unbiased?
6. To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation decisions are transparent and comprehensible to applicants?

In addition to the six focal evaluation questions, the SNSF specified 26 subquestions that are grouped into questions related to the SNSF's (1) structures and environments, (2) targets, criteria, guidelines, and procedures, (3) transparency and comprehensibility, and (4) impacts (see Appendix A). In total, 32 unique evaluation questions are addressed in this report; including both focal evaluation questions and their subquestions.

Purposes of the Evaluation

The central purpose of the evaluation, as specified by the SNSF, was formative so that the transparency and overall quality of evaluation at the SNSF could be systematically improved. However, the evaluation also may serve certain summative purposes, such as accountability ("a state of, or process for, holding someone to account to someone else for something — that is, being required to justify or explain what has been done" [Rogers, 2005, p. 2]).

More generally, the evaluation was intended to provide the SNSF with accurate and precise information for making well-informed, non-arbitrary, actionable, and defensible decisions, as well as to demonstrate independent, external evidence for improvement and accountability functions.

Uses and Users of the Evaluation

The primary intended uses of the evaluation include instrumental uses, where evaluation results could directly change the SNSF; conceptual uses, where results might indirectly change the SNSF through

learning; and symbolic uses, which are purely for signaling purposes that produce no immediately observable changes (Cousins, 2004; Eckerd & Moulton, 2011). Such uses, should they occur, would ideally optimize the performance of the SNSF and ultimately enhance the quality of research in Switzerland.

In an effort to facilitate and increase the likelihood of evaluation use and impact, relevant stakeholders within the SNSF were consulted at various stages of the evaluation process (Cousins, 2003, 2004; Cousins, Donohue, & Bloom, 1996; Cousins & Earl, 1992; Cousins & Whitmore, 1998; Cullen & Coryn, 2011; Cullen, Coryn, & Rugh, 2011; Patton, 2012). As described in the inception and interim reports of this evaluation (Coryn, Applegate, Schröter, Martens, & McCowen, 2012; Martens, McCowen, Schröter, Coryn, & Applegate, 2012), the most extensive participation of SNSF stakeholders occurred when reformulating and ordering the focal evaluation questions and subquestions, through a feasibility analysis, including elimination of particular questions that were beyond the scope and resources of the current evaluation (e.g., the use of bibliometric methods for informing funding decisions; see Coryn, 2006; Coryn, Hattie, Scriven, & Hartmann, 2007; Coryn & Scriven, 2008), and when defining and operationalizing key terminology such as ‘bias,’ ‘transparency,’ and ‘young researcher.’

Though key SNSF stakeholders were consulted throughout the evaluation process, independence and objectivity were maintained using several strategies and safeguards. In particular, an explicit effort was made to intentionally avoid adopting any one point of view or perspective, including those of the evaluators, in order to represent all relevant interests fairly (Markiewicz, 2008; Stufflebeam & Coryn, 2012; Swiss Evaluation Society, 2000). A situational analysis (Patton, 2008) also was conducted, through direct interactions and interviews with various potential users as well as a survey of members of the SNSF Foundation Council (FC). This analysis was

devised to determine who within the SNSF would likely use the evaluation and for what specific purposes so that the evaluation could accommodate individual information needs. The results of the situational analysis varied widely, from likely nonuse of the evaluation by some decision makers within the SNSF (e.g., “I generally do not take these exercises too seriously”) to clear instrumental uses by others (e.g., “I strongly expect that the SNSF will make immediate use of the conclusions and recommendations for improving its evaluation procedures and administrative handlings”).

The primary intended users of the evaluation are the SNSF’s FC, National Research Council (NRC), and Secretariat. Other potential users and interested stakeholders include, but are not limited to, the Swiss federal government, cantonal governments, academic institutions, research communities and scientific disciplines, individual researchers, and the general Swiss public.

Methods

The evaluation of the transparency and overall quality of evaluation at the SNSF was conducted using a utilization-focused, mixed method design. The design included semi-structured interviews with key SNSF actors and informants; surveys of the SNSF Foundation Council, applicants for funding, and external reviewers of funding applications; and analyses of extant data and documents.

Evaluation Approach and Design

The general approach used to evaluate the transparency and overall quality of evaluation at the SNSF was utilization-focused (Patton, 2008; Stufflebeam & Coryn, 2012). By being utilization-focused, all aspects of the evaluation were planned, designed, and executed with the explicit intent to assist potential users apply the evaluation findings in a way that ensures maximum evaluation impact (Patton, 2008).

Methodologically, a concurrent mixed method design (Creswell, 2009; Creswell, Plano Clark, Gutmann, & Hanson, 2003; Greene, 2007; Morse & Niehaus, 2009; Tashakkori & Teddlie, 2003), giving equal priority to both quantitative and qualitative methods, was used to evaluate the overall quality and transparency of evaluation at the SNSF. The design was concurrent in that the evaluation's quantitative and qualitative methods essentially occurred simultaneously. It was equal priority in that both quantitative and qualitative methods, data, and analyses were given equal weighting in the interpretation of findings. Quantitatively, internet-based surveys of key informants — intentionally designed to reduce errors of coverage, sampling, nonresponse, and measurement — were a primary mechanism for gathering information; additional quantitative information was provided by the SNSF via extant data on applicants and applications from 2006 through 2011. Qualitatively, semi-structured interviews with relevant SNSF actors and key informants were conducted. In addition, relevant documents including (but not limited to) SNSF policies and procedures, SNSF guidelines, and external and internal reports were retrospectively analyzed. Although the general design was concurrent, in certain instances the design also was sequential (i.e., one method was used to inform another). For instance, the design of survey

questionnaires occurred following analysis of semi-structured interview data.

A tabular matrix showing the evaluation methods used (i.e., document analysis, interviews, surveys, analysis of extant data) to address each of the six focal evaluation questions and 26 subquestions is provided in Appendix B.

Samples

Where relevant and feasible, statistical probability sampling methods were used to gather information pertaining to the focal evaluation questions and subquestions. Population sizes and, ultimately, the sampling frames used to select relevant SNSF actors and key informants were determined using inclusion and exclusion criteria that varied as a function of the focal evaluation questions and subquestions, in particular for samples of interviewees.

Documents. Documents provided by the SNSF for the evaluation included SNSF policies and procedures, guidelines, external and internal reports, as well as other forms of textual information issued by the SNSF ($N = 104$ unique documents). Of these, $n = 45$ were considered relevant to the focal evaluation questions and subquestions (see Appendix C).

Interviews. Semi-structured interviews were conducted with a total of $n = 99$ SNSF actors and key informants with adequate knowledge related to the evaluation questions. Census samples were taken for the presidium of the FC ($N = 2$), the presiding board of the NRC ($N = 8$), and members of the Secretariat ($N = 58$). Selection of the list of secretariat personnel who met inclusion criteria was developed jointly with SNSF stakeholders. For other members of the NRC (i.e., those not serving on the presiding board), selection of interviewees and sample sizes were determined using stratified random sampling with sample sizes within groups (i.e., strata) approximately proportional to group size after down-weighting for

cross group membership. This process resulted in a total sample of $n = 31$. Of these, $n = 5$ were selected from Division I, $n = 5$ from Division II, $n = 7$ from Division III (of which $n = 4$ were from Section A and $n = 3$ were from Section B), and $n = 4$ from Division IV. Also included in the NRC total sample of $n = 31$, were members of the three NRC specialized committees ($n = 3$ from Careers, $n = 4$ from Interdisciplinary Research [CoRe], and $n = 3$ from International Co-operation [Coop]). Due to the small number of key informants within most interviewee subgroups, the expression “interviewees” is frequently used — unless absolutely essential to do otherwise — in the ‘Findings’ and ‘Conclusions’ sections of this report in order to protect the confidentiality of respondents.

The total population sizes and sampling frames for the various SNSF actors and key informants deviate slightly from those reported by the SNSF in official documents due to incoming and outgoing membership in these groups or those serving in multiple capacities. In such instances, persons with multiple group affiliations were placed within only a single group (i.e., sampling frame). This procedure was designed to eliminate duplicates across strata (i.e., SNSF actors and key informants appearing in more than one group). After resampling and replacement, a response rate of 100% was obtained for interviews of SNSF actors and key informants.

Survey of the SNSF Foundation Council. For the survey of the FC, a census was taken of the non-presidium FC members ($N = 36$). The FC president and vice president were not included in the sampling frame as they participated in interviews. An overall response rate of 55.55% ($n = 20$) was obtained for the survey of FC members. Meta-analyses have found that, on average, surveys of similar types of populations (i.e., executives and intellectual elites) using similar methods (i.e., web-based surveys) have response rates ranging from approximately 32.00% to 37.00% (Cycyota & Harrison, 2006; Sheehan, 2001).

Survey of SNSF Applicants. For the survey of SNSF applicants, the database provided by the SNSF had a total of $N = 27,006$ unique applications whose submissions occurred from 2006 through 2011. Applicant gender (i.e., male, female) and funding status (i.e., funded, unfunded) were used as sampling strata. A total of $N = 155$ applications had no gender

identified in the SNSF applicant database and were, therefore, excluded, resulting in a total of $N = 26,860$ usable, unique applications with an identifiable gender. A stratified random sample, with sample size proportional to stratum, from the $N = 26,860$ remaining records, with a bound on the error of estimation of $\pm 5\%$ and assuming a population proportion of $p = 0.50$, yielded a necessary sample size of $n = 395$, using a conservative estimate (Scheaffer, Mendenhall III, Ott, & Gerow, 2012). A 20% oversample was taken to account for potential nonresponse ($n = 474$). However, this sample size was adjusted to $n = 419$ given that $n = 6$ applicants had missing e-mail addresses, $n = 8$ had duplicate names, and $n = 40$ had invalid e-mail addresses. From the adjusted stratified random sample ($n = 419$), an overall response rate of 57.99% ($n = 243$) was obtained for the survey of applicants. As noted for the survey of the FC, meta-analyses have found that, on average, surveys of similar types of populations (i.e., executives and intellectual elites) using similar methods (i.e., web-based surveys) have response rates ranging from approximately 32.00% to 37.00% (Cycyota & Harrison, 2006; Sheehan, 2001).

A χ^2 test comparing funded and unfunded applications by population (i.e., the total population of applicants, the selected stratified random sample, and the obtained sample) by gender (i.e., funding status \times population \times gender) revealed no statistically significant pattern by respondent’s gender as a function of population for unfunded applicants, where χ^2 ($df = 2$, $N = 6,519$) = 0.97, $p = 0.61$. However, for funded applications, male applicants are overrepresented in the sample, where χ^2 ($df = 2$, $N = 6,854$) = 8.46, $p = 0.01$. To determine if these two χ^2 models were statistically different the two χ^2 test statistics were pooled with four degrees of freedom. This test is approximately distributed as a χ^2 , and pooling the two tests obtains $0.97 + 8.46 = 9.44$, $p > 0.05$, with a critical $\chi^2 = 9.48$. These results suggest that there is not a statistically significant difference between the two tests, thus pooling over funding status is legitimate and the obtained sample likely is representative of the population from which it was taken. This inference was further validated through a log-linear model, in which the three-way interaction between funding status \times population \times gender was not found to be statistically significant ($p = 0.22$).

Of the sample of applicants, 1.00% reported that they were either current (0.50%) or former (0.50%) members of the FC, 6.05% were either current (3.52%) or former (2.53%) members of the NRC, 1.02% were either current (although not currently having a SNSF grant; 0.51%) or former (0.51%) members of the Secretariat, and 44.04% had served as external reviewers of funding applications on behalf of the SNSF.

Survey of SNSF External Reviewers. For the survey of external reviewers, the database provided by the SNSF had a total of $N = 102,721$ external reviewers. Of these, $N = 47,023$ (46%) had supplied one or more reviews of applications. A simple random sample from the $N = 47,023$ external reviewers who had supplied one or more reviews of applications, and assuming a population proportion of $p = 0.50$, yielded a necessary sample size of $n = 381$ (using a conservative estimate) with a bound on the error of estimation of $\pm 5\%$. A 20% oversample was taken to account for potential nonresponse, resulting in a final sample size of $n = 455$, which was adjusted to $n = 436$ after accounting for undeliverable e-mail addresses ($n = 19$). From the adjusted, usable simple random sample ($n = 436$), an overall response rate of 50.19% ($n = 222$) was obtained.

A χ^2 test contrasting gender and population (i.e., the total population of SNSF external reviewers, the selected simple random sample, and the obtained sample) was not statistically significant ($p = .47$), indicating no evidence of non-response bias in the sample and that the sample is representative of the larger population relative to gender. Moreover, results from an analysis of variance (ANOVA) for the total number of times that the SNSF solicited an external review by population (i.e., the total population of SNSF external reviewers, the selected simple random sample, and the obtained sample) was not statistically significant ($F [df = 2, N = 28,050] = 1.31, p = .26$), indicating no compelling evidence of non-response bias and that external reviewer survey respondents are representative of the population from which they were drawn.

Of the sample of external reviewers, 19.80% indicated that they were recipients of SNSF funding. In addition, 1.02% reported that they were either current (0.51%) or former (0.51%) members of the FC and 3.55% were either current (although not

currently having a SNSF grant; 1.52%) or former (2.03%) members of the NRC.

Instrumentation

All instrumentation was created specifically for the evaluation (i.e., study-specific). Due to time and resource constraints, pretesting and/or pilot testing of measurement devices was not feasible.

Interview Protocols. All interview protocols were semi-structured and intentionally flexible. The interviews focused on general questions or topics, but permitted a conversational approach, allowing for two-way communication between interviewer and participant. The questions and topics discussed in the interviews focused on the focal evaluation questions and subquestions, but were tailored for specific interviewee groups. For example, when interviewing NRC members, the protocol included semi-structured question prompts intended to elicit information about application evaluation procedures, selection and recruitment of external reviewers, transparency of evaluation and overall evaluation quality, and feedback provided to applicants, among others. Moreover, the protocols were designed to explicitly and intentionally elicit important and relevant cultural, contextual, political, and structural knowledge from interviewees (Johnson & Weller, 2001; Ryen, 2001; Scriven, 1991).

Survey of the SNSF Foundation Council. The survey of the FC was designed to provide information about the context of the evaluation, rather than information directly pertaining to specific focal evaluation questions or subquestions. Questions asked of the FC in the survey pertained to the internal and external influences on their policy-making as well as their perspectives on the transparency and overall quality of evaluation at the SNSF. The FC survey is provided in Appendix D. Indices of internal consistency (e.g., Cronbach's α) were not relevant for the FC reviewer survey given that there were no multi-item clusters included in the survey.

Survey of SNSF Applicants. The survey of applicants consisted of closed-response, partially-closed-response, and open-response items designed to elicit perspectives and opinions regarding the transparency of the SNSF application process, the SNSF review criteria, the SNSF review process, and the feedback provided by the SNSF. The applicant survey and

summary statistics for the applicant survey are provided in Appendix E.

Internal consistency (i.e., Cronbach's α) for item clusters (i.e., sets of items conceptually related to the same latent construct and which could logically form a composite variable) for the applicant survey ranged from Cronbach's $\alpha = .56$ to $\alpha = .94$.

Transparency, Criteria, and Process Item Clusters	α
Understanding of SNSF application documents	.66
Usefulness of SNSF application documents	.76
Feedback received from the SNSF	.83
Clarity of the SNSF	.78
Scientific track record	.84
Expertise	.87
Scientific relevance	.88
Originality	.90
Topicality	.93
Broader impact	.93
Suitability of methods	.93
Feasibility	.94
Favoritism	.56

Items in the Q13 through Q20 clusters (see Appendix E) were worded to ask applicants to respond to a common prompt across seven different focal areas related to the SNSF's objectives (e.g., 'supporting excellent research in all disciplines'). Given that Q13 through Q20 shared the same set of focal response targets related to the SNSF's objectives, composite variables crossing items within each focal area were created. Internal consistency estimates for SNSF objective-related item clusters ranged from Cronbach's $\alpha = .84$ to $\alpha = .92$.

Objective-Related Item Clusters	α
Supporting excellent research in all disciplines	.86
Supporting scientifically relevant research	.84
Supporting scientifically original research	.87
Increasing the competitiveness of Swiss research	.87
Increasing the competitiveness of Swiss researchers	.88
Supporting junior/young researchers	.89
Supporting female researchers	.92

Survey of SNSF External Reviewers. The survey of external reviewers consisted of closed-response, partially-closed-response, and open-response items designed to elicit the perspectives and opinions of external reviewers regarding their experiences reviewing for other research funding organizations, the SNSF review criteria, and the SNSF review process, among others. The external reviewer survey and summary statistics for the external reviewer survey are provided in Appendix F. Indices of internal consistency were not relevant for the external reviewer survey given that there were no multi-item clusters included in the survey.

Procedures

Multiple procedures were used to gather information and data for addressing the focal evaluation questions and subquestions.

Documents. SNSF documents, including SNSF policies and procedures, guidelines, and external and internal reports, were delivered directly by the SNSF via e-mail or provided through the *mySNF* platform.

Interviews. Most interviews were conducted in English onsite at the SNSF offices in Bern, Switzerland, in June 2012. Interviews that could not be scheduled in Bern were conducted at other locations (e.g., Geneva, Basel) or using videoconferencing or teleconferencing methods (i.e., Skype, telephone). A small number of interviews were conducted in German at the request of interviewees. The designed length of the interviews was approximately 50 minutes; in practice, interviews ranged from approximately 25 to 70 minutes. Prior to conducting each interview, interviewees were informed that their responses would be kept confidential, and they were asked if the interview could be recorded on a digital recording device. No incentives were used to elicit interview participation.

Surveys. All surveys were administered in English via a web-based survey system. No incentives were used to elicit participation in any of the surveys. Following empirically-based best practices for survey methods (e.g., applying multiple motivational features in compatible and mutually supportive ways to encourage high quantity and quality of responses, known as the theory of social exchange; Dillman, Smyth, & Christian, 2009), presurvey notices and

survey invitations were sent approximately one week apart, with completion reminders sent weekly thereafter. Each survey participant was assigned a unique survey URL, so that nonrespondents could be contacted and nonresponse bias estimated. Each survey was available for completion by each of the respondent groups for approximately four to six weeks.

For the samples of applicants and external reviewers, each of whom were assigned a unique, randomly assigned identification number, samples were drawn from a randomly generated seed using the SURVEYSELECT procedure in SAS 9.3. The seed selection for both samples assumed a uniform distribution and was fixed to 47,320,303 and 47,274, respectively, so that the sample selection procedures could be replicated if necessary.

Data Processing

Processing of qualitative and quantitative information and data varied widely from one method to another. All data and other information pertaining to the evaluation were stored on a secure server at Western Michigan University's (WMU) Evaluation Center (EC).

Documents. All relevant documents were entered into a Microsoft Access database, in which the primary fields consisted of the focal evaluation questions and subquestions as well as document identifiers. The database was constructed to allow for sorting and generation of reports by the focal evaluation questions and subquestions. All relevant documents were imported into MaxQDA 10 for analysis.

Interviews. All digital audio recordings of interviews were translated to English (no back translation was performed), and transcribed into text files and then imported into MaxQDA 10 for analysis. The transcriptionists were instructed to destroy their copies of both the audio and text files following completion and delivery of the transcriptions. The only copies of these files are those stored on a secure server at WMU's EC.

Surveys. Closed-response and partially-closed-response data obtained through the web-based surveys of the FC, applicants, and external reviewers were downloaded from the web-based survey system as tab-delimited and then were imported into SAS 9.3 for processing and analysis. Open-response data were

imported as text files into MaxQDA 10 for analysis.

Extant Data. Extant data on applications from the period between 2005 and 2012 were provided by the SNSF. These data were imported into SAS 9.3 for processing. As part of the applicant database processing and cleaning procedure, only records having a start date on or after 2006 were retained and those after 2011 were omitted. This processing procedure is described in greater detail in Appendix G. From the original $N = 34,842$ records, $N = 27,006$ unique, unduplicated records remained after restructuring the database and excluding records outside of the desired time period as well as accounting for multiple records and other criteria (e.g., missing ruling dates, initial disbursements greater than one) used to generate a unique record for each application. No specialized processing or restructuring was required for the external reviewer database.

Data Analysis

Analysis of all documents, interviews, surveys, and extant data were conducted according to generally accepted scientific standards and also adhered to the United States *The Program Evaluation Standards* (Joint Committee on Standards for Educational Evaluation, 2011), American Evaluation Association (AEA) *Guiding Principles for Evaluators* (American Evaluation Association, 2004), and Swiss Evaluation Society (SEVAL) *Evaluation Standards of SEVAL* (Swiss Evaluation Society, 2000).

Documents. Using content analysis methods, individual segments of text were reviewed and coded by a single coder based on their content and relationship to the focal evaluation questions and subquestions (Krippendorff, 2012). The initial coding scheme was derived deductively from the focal evaluation questions and subquestions. These served as 'parent' codes. The coding scheme was then applied to phrases, sentences, and other meaningful text segments within each document using MaxQDA 10. Once the coding process was complete, each segment to which a particular code was assigned was retrieved and directly compared. Following retrieval, the coded segments were analyzed based on their relationships to one another, resulting in a synthesis of the codes across all coded segments.

Interviews. Using content analysis methods,

individual segments of text were reviewed and coded based on their content and relationship to the evaluation questions (Krippendorff, 2012). The coding scheme was derived deductively from the focal evaluation questions and subquestions. These served as ‘parent’ codes. Additional codes that arose inductively as the analysis progressed served as ‘child’ codes, which were nested within parent codes. The coding scheme was then applied to phrases, sentences, and other meaningful text segments within each document included in the analysis using MaxQDA 10. Once the coding process was complete, each segment to which a particular code was assigned was retrieved and directly compared, including comparisons between interviewee groups where relevant. Following retrieval, the coded segments were analyzed based on their relationships to one another, resulting in a synthesis of the codes across all coded segments.

Surveys. Closed-response and partially-closed-response items from the surveys of the FC, applicants, and external reviewers were analyzed in SAS 9.3 using descriptive and inferential statistics. Open-response items from the surveys of the FC, applicants, and external reviewers were analyzed using deductive and inductive coding procedures in MaxQDA 10.

For the applicant survey, sampling weights of 110.14 for unfunded male applicants, 110.39 for funded male applicants, 109.29 for unfunded female applicants, and 112.28 for funded female applicants was derived and used for analyses of the $n = 243$ survey responses. For the external reviewer survey, a sampling weight of 126.45 was derived and used for analyses of the $n = 222$ survey responses. These sampling weights were used for multiple purposes including, but not limited to, deriving appropriate standard errors (SEs) and 95% confidence intervals (CIs) — including the lower limit (LL) and upper limit (UL) associated with 95% CIs — for estimating population parameters from the samples of applicants and external reviewers.

Extant Data. In general, extant data on applicants and external reviewers were used to select survey samples, to determine potential biases in obtained samples, and for computing sampling weights. However, additional descriptive and inferential statistical procedures, including a (modified)

replication of the logistic regression analysis reported in an SNSF internal report (Swiss National Science Foundation, 2011a) to examine statistical antecedents and predictors of SNSF funding, including potential biases against young and/or female researchers, were conducted on the applicant database using SAS 9.3.

Integration, Synthesis, and Triangulation. Findings and conclusions for the focal evaluation questions, in particular, and subquestions, secondarily, are based on cross-examination of qualitative and quantitative information arising from multiple sources of information at the level of the specific question that each source of information was designed to address (Creswell, 2009; Miles & Huberman, 1994). That is, ‘between-methods’ (Denzin, 1978), or ‘conjunctive’ (Howe, 2012), triangulation was used to systematically integrate information across documents, interviews, surveys, and extant data relevant to the same evaluation question. Conclusions derived from this process are intended to represent a refined synthesis of the findings on the subquestions for interpretation applied to the broader, focal questions of the evaluation. Moreover, and arising through the process of integration, synthesis, and triangulation, extensive efforts were made to render ‘evaluative conclusions’ (i.e., conclusions related to merit or worth) as opposed to merely descriptive, factual claims or conclusions (Coryn, 2007; Davidson, 2005; Scriven, 1994).

Findings

Findings related to the evaluation subquestions indicate that evaluations of funding applications conducted by the SNSF are, generally, both transparent and of high quality. Even so, certain aspects of the SNSF's evaluation policies, procedures, and execution are less than optimal as related to achieving the SNSF's specified objectives.

Navigation through the Findings

The numbering of the findings presented below corresponds to the numbering of the subquestions provided in Appendix A, which begins with subquestion 7 and concludes with subquestion 32. Findings related to the focal evaluation questions, numbered 1 through 6, are presented in the next section of the report, titled 'Conclusions,' as answers to the focal evaluation questions required integration, synthesis, and triangulation across evidence derived from the findings related to the each of the evaluation's specific subquestions (see Appendix B).

Subquestion Findings

The findings reported in the following section reflect only those derived from information and analyses of SNSF documents, interviews with key actors and informants, surveys of the SNSF FC, applicants, and external reviewers, and extant data. Consistent with the SNSF's request, the findings are grouped into subquestions related to SNSF structures and environments; targets, criteria, guidelines, and procedures; transparency and comprehensibility; and impacts, as enumerated in Appendix A.

Structures and Environment

7. *Do the recruitment, election, and selection procedures result in the appointment of personnel to the National Research Council and its specialized sub-committees who are both qualified and independent?*

According to the authors of a 2001 external evaluation of the SNSF, it was concluded that the NRC "...does not always appear to attract the best Swiss scientists and scholars..." (Denis et al., 2001, p. 22). The same report notes that NRC members select new members from among the most qualified researchers in Switzerland, and occasionally from abroad. Also of relevance is that the overall competence of the NRC is

periodically reviewed by the Secretariat on behalf of the NRC presidency, and no negative claims have surfaced as of 2001 (Denis et al., 2001).

Overall, there is general agreement that members of the NRC are highly qualified. They are all experienced, senior researchers who hold the respect of their peers and colleagues. Members of the NRC also reported that they and their colleagues take great caution to avoid both the substance and appearance of bias or lack of independence.

However, the current procedure for filling vacancies in the NRC is unclear and inconsistent to those outside of the "closed" process. One interviewee, for example, within the NRC described the process of his or her own recruitment as "opaque." The process often begins with a search committee that includes the president of the division, and often (but not always) requires interviews with individuals from a short list of three to four potential candidates. However, other elements of the process appear to have little consistency. For instance, many interviewees described their own recruitment as the result of a direct request from a current member of the NRC (i.e., "headhunting"), whereas others were nominated by someone at their institution, and still others submitted applications in response to a public request.

Moreover, many NRC members described the development of a "profile" for the ideal candidate to fill a vacancy. In some cases, the profile was overly narrow, creating misalignment between the desired profile and the qualifications of actual applicants.

8. *Do the recruitment, election, and selection procedures for external reviewers and members of review panels result in the appointment of*

personnel who are both qualified and independent?

According to SNSF documents, recruitment procedures for external reviewers currently require substantial investments of time and energy by members of both the NRC and the Secretariat, which ultimately result in an increasingly international and reasonably well-qualified body of reviewers. In addition, the NRC has now adopted guidelines and procedures intended to provide information on the usefulness of external reviewers' assessments of funding applications (Swiss National Science Foundation, 2011b).

The procedure for recruiting external reviewers varies widely among divisions and elsewhere within the SNSF, and often does so according to the particular preferences of the assigned application referee (and, in some instances, co-referee). Furthermore, the response rate to requests for (external) evaluations is relatively low, with most interviewees reporting that anywhere from 6 to 12 external reviewers need to be contacted in order to obtain 2 complete external evaluations of an application. In general, interviewees indicated an average rate of agreement by external reviewers to complete evaluations of applications of 30%. This finding, from interviewees, however, differs from the agreement rate reported in an SNSF internal report of approximately 40% (Swiss National Science Foundation, 2012b), and one potential reason for the discrepancy is confirmation bias on the part of interviewees. Accordingly, many interviewees described situations in which the need to obtain an evaluation of an application is more essential than the external reviewers' qualifications.

Even so, the qualifications of external reviewers for the SNSF are, by nearly any standard, impressive. On average, solicited external reviewers have served as peer reviewers for scholarly journals for more than 17 years ($M = 17.59$, $LL = 16.27$, $UL = 18.90$), as reviewers of applications for grant-making organizations for more than 12 years ($M = 12.19$, $LL = 11.01$, $UL = 13.37$), and as SNSF application reviewers for approximately five years ($M = 4.59$, $LL = 0.31$,

$UL = 3.96$). These same external reviewers indicated that, in the past year, they conducted, on average, 28 reviews for scholarly journals ($M = 28.26$, $LL = 15.89$, $UL = 40.63$), almost seven reviews of applications for grant-making organizations ($M = 6.75$, $LL = 4.93$, $UL = 8.57$), and one SNSF application evaluation ($M = 0.89$, $LL = 0.66$, $UL = 1.11$). By comparison, professors recently surveyed in Germany by the Institut für Forschungsinformation und Qualitätssicherung (Böhmer, Neufeld, Hinze, Klode, & Hornbostel, 2011) reported lower annual averages of reviews for scholarly journals ($M = 13$; no standard deviations were provided and all estimates were provided as whole numbers) and funding applications, overall. While the actual annual averages reported by German professors providing reviews of applications for research funding on behalf of the Deutsche Forschungsgemeinschaft (DFG) and other funding organizations cannot be directly ascertained from the report — as the German study was based on response categories (i.e., '0,' '1,' '2-3,' and '4 or more') rather than actual numbers of applications reviewed —, results of the study, nonetheless, indicate that four or more applications were reviewed in the last year by 9% of respondents (1% indicated reviewing no applications). Larger percentages of German professors reported reviewing one (68%) or two to three applications (22%) in the year prior to the survey.

External reviewers for the SNSF indicated that they have received, on average, more than three requests from the SNSF to complete reviews of funding applications ($M = 3.53$, $LL = 1.64$, $UL = 5.06$). In addition, 81.28% of external reviewers have received research funding from foundations other than the SNSF. Nearly half of external reviewers (46.11%) also indicated that their prior review experiences have 'some influence' or 'a lot of influence' (38.34%) on how they complete evaluations of SNSF applications.

More than half (53.00%) of external reviewers indicated that the e-mail solicitation sent by the SNSF to conduct evaluations of applications was 'persuasive,' whereas 28.00% indicated that the e-mail solicitation was only 'somewhat

persuasive.’ Fewer, 11.50% and 7.50%, indicated that the e-mail solicitation to conduct evaluations was ‘not at all persuasive’ or ‘very persuasive,’ respectively.

Motivating factors reported by external reviewers for conducting evaluations of applications included ‘to support my field of research’ (87.31%), ‘to remain current with new developments in European research’ (71.71%), ‘to support the SNSF’ (63.63%), ‘to support research in Switzerland’ (61.34%), ‘to learn more about preparing funding applications for the SNSF’ (19.17%), and ‘so that my name will be familiar to the SNSF when I apply for funding’ (10.36%). For external reviewers surveyed who reside in Switzerland ($n = 43$) — e-mail addresses ending in ‘.ch’ were used as a proxy for residency in Switzerland, as recommended by the SNSF — statistically significant differences between Swiss and non-Swiss residents were found for several motivational factors related to external reviewers agreeing to evaluate funding applications. Specifically, Swiss residents were statistically more likely to complete evaluations of funding applications — compared to non-Swiss residents — in order ‘to support the SNSF’ ($X^2 [df = 1, N = 198] = 24.84, p < 0.01$), ‘to support research in Switzerland’ ($X^2 [df = 1, N = 194] = 20.63, p < 0.01$), and ‘so that my name will be familiar to the SNSF when I apply for funding’ ($X^2 [df = 1, N = 193] = 24.83, p < 0.01$).

As regards independence, however, 19.8% (nearly 1 in 5) of external reviewers indicated that they were recipients of SNSF funding. In addition, 1.02% reported that they were either current (0.51%) or former (0.51%) members of the FC and 3.55% were either current (although not currently having a SNSF grant; 1.52%) or former (2.03%) members of the NRC.

That being said, the independence of reviewers is generally perceived as acceptable, and members of the Secretariat are conscientious about ensuring that conflicts of interest are minimized. However, two aspects of reviewer independence arose frequently. First, reviewers from Switzerland are generally perceived as more reliable (they are much more likely to complete a

review if requested), which results in their inclusion far more often than size of the Swiss research community would otherwise suggest. Second, many members of the NRC felt that reviewers suggested by applicants as part of the “positive list” are strongly biased toward favoring applicants, and are unlikely to submit a critical review.

One-fifth of external reviewers reported that the ‘potential for being identified as a reviewer by the applicant’ (19.11%) influences their evaluations and that the ‘potential for offending the applicant’ (20.29%) influences their evaluations of applications.

A majority of external reviewers (86.43%) also indicated that they do not need specialized training for conducting evaluations of SNSF applications and 91.58% indicated that they do not typically receive training when conducting evaluations for other foundations. A small minority (13.56%), however, reported that training for external reviewers is needed. If the SNSF were to offer training for external reviewers, ‘self-paced training via written guidelines’ (33.72%) or ‘self-paced training through an online tutorial’ (25.00%) are the preferred modes of delivery reported by external reviewers.

One-fourth (25.00%) of external reviewers reported receiving financial compensation when conducting reviews for similar foundations. Overall, 44.66% of external reviewers reported that if the SNSF were to offer monetary compensation for evaluations of applications that they would be ‘somewhat more likely’ to provide reviews in the future and 26.69% indicated that they would be ‘much more likely’ to provide reviews in the future if offered compensation. Combined, 71.35% of external reviewers favor monetary compensation for providing evaluations of funding applications.

9. *Do the recruitment, election, and selection procedures result in the appointment of personnel to the National Research Council-elected commissions who are both qualified and independent?*

Little information is available about this

procedure. Both the NRC and Secretariat are generally satisfied with the qualifications and independence of members of these commissions. However, the nature of the recruitment process is too unclear for a valid assessment of the qualifications and independence that result from such procedures.

The procedure for recruiting, selecting, and electing members of the NRC is briefly described in the SNSF's *Organisational Regulations of the National Research Council of 14 November 2007* (Swiss National Science Foundation, 2007), but it is uncertain whether clear, publicly available documentation regarding the procedure(s) exist(s).

10. *Do the recruitment, election, and selection procedures result in the appointment of personnel to the Research Commissions at institutions of higher education who are both qualified and independent?*

The available information pertinent to this question was limited, since most members of the NRC and Secretariat have little direct contact with the Research Commissions. However, there is little reason to suspect problems with independence or bias, since the Research Commissions generally appear to be limited in scope to determining the status of applicants at a particular institution for certain types of career funding. Similarly, since membership appears to be drawn from senior professors at each institution, and the type and quantity of applications reviewed are both restricted in comparison to the duties of members of the NRC, members of the Research Commissions are likely to be well qualified.

11. *What is the typical workload (in comparison to similar bodies at similar foundations) of members of the National Research Council and external reviewers?*

Although no external benchmarks for workload in similar foundations currently exist, either in Switzerland or internationally (Coryn, 2007; Coryn, Hattie, Scriven, & Hartmann, 2007; Coryn & Scriven, 2008), all evidence derived through the evaluation suggests that the workload at the SNSF is likely quite high and,

therefore, atypical relative to similar foundations throughout the world. Even so, in the book *How Professors Think: Inside the Curious World of Academic Judgment*, Lamont (2009) alludes to the possibility that the workload of certain types of review panels and individual reviewers in other research-funding foundations — in particular, those conducted in the social sciences and humanities — is likely significantly higher than the workload of those involved in evaluating applications submitted to the SNSF. Even so, and as previously stated, no universal or validated external benchmarks or standards related to the workloads of those involved in evaluating applications for funding submitted to foundations similar to the SNSF are currently available.

According to interviewees, it is not unusual for a member of the NRC to serve as referee for 14 to 18 applications per semester, with the additional responsibility for approximately the same number as co-referee; although the duties of co-referees are substantially lower than the duties of referees (e.g., each member of the NRC is therefore responsible for 28 to 36 applications per semester). Applications also are not evenly distributed among subjects or specialties, leading to frequent misalignment between an NRC member's expertise and the subject of an application. These cases require additional work, due to the fact that a referee must identify experts working outside his or her own domain of knowledge. Additionally, many members also accept additional service on specialized or interdisciplinary committees. The workload resulting from these commitments varies widely, from only three to four applications, to as many as 14 to 15 applications at any point in time.

Descriptions of the workload by interviewees also displayed substantial variability. However, the most typical response of interviewees, from Divisions I, II, and III, was that their workload exceeded the nominal commitment of 20%, (i.e., one day per week), particularly near the end of each semester.

The usual experience in Division IV, however, differs slightly, given that the division usually manages a smaller number of applications, which

are structured very differently relative to other divisions. The workload of members of Division IV appears to be somewhat more manageable, perhaps due to the more consistent flow of work through each semester.

No interviewee indicated direct experience with both the workload at SNSF and the workload at other national funding agencies. Those with experience applying to or conducting reviews for agencies in France, Germany, Belgium, or the United States, for example, believed that the workload for referees is somewhat higher in the SNSF.

In contrast, external reviewers indicated that the workload required is essentially 'about the same' (92.11%) as that required for completing reviews for other, similar foundations. Only 3.94% of external reviewers, however, indicated that evaluations of SNSF applications required 'more' time to complete relative to evaluating applications for other foundations. Even so, a majority of external reviewers also indicated that reviewing funding applications on behalf of the SNSF competes with their other responsibilities 'somewhat' (60.78%) or 'a lot' (29.90%). Simultaneously, they also indicated that the reasonableness of the timeframe given for completing evaluations of SNSF applications is 'somewhat reasonable' (65.53%). Only a small minority indicated that the timeframe given for completing evaluations are 'somewhat unreasonable' (6.79%) or 'very unreasonable' (1.45%).

12. *Does the current workload of the National Research Council inhibit the SNSF goal of supporting excellent research and/or the goal of ensuring that evaluation procedures are fair and unbiased?*

Authors of both the 2001 external evaluation of the SNSF (Denis et al., 2001) and in an SNSF internal report (Swiss National Science Foundation, 2011c) suggest that the growing workload of members of the NRC is likely to seriously inhibit the SNSF's goals of supporting excellent research and ensuring fair and unbiased evaluations of funding applications in the future.

NRC members in Divisions I, II, and III typically

characterize their workload as very high, and many also believe that the work is difficult to manage while also accommodating other responsibilities. Moreover, many members of both the NRC and Secretariat, across all divisions, also expressed concern that the workload is likely to continue to increase. Even those who find the current workload manageable question how the NRC will accommodate the increasing workload as the number of applications continues to rise.

13. *Do the structure, organization, and composition of the National Research Council, as a whole, and the component evaluation panels and commissions facilitate or inhibit the SNSF goals of supporting excellent research and ensuring evaluation procedures are fair and unbiased?*

SNSF documents indicate that the general structure, organization, and composition of the NRC facilitates the simple and orderly flow and aggregation of information about a particular proposal, culminating in a decision with an objective, written recommendation. However, the three major content divisions of the NRC are remarkably heterogeneous in structure. For instance, Division III has two separate subdivisions and Division I accepts and referees applications in multiple languages. Acceptance rates and funding rates (as a percentage of requested funding) also differ significantly among divisions, as do differential rates of acceptance for particular groups (Swiss National Science Foundation, 2012a).

All interviewees, in both the NRC and Secretariat, view the structure, organization, and composition of the NRC as a whole as generally supportive of the SNSF's mission and goals. Accordingly, the structure appears to balance the need for a broad range of expertise with the need for reasonably deep expertise in particular subject areas. However, particularly in conjunction with concerns over workload, several interviewees indicated that current circumstances would soon require either an increase in the number of members of the NRC or an increase in the number of people recruited to participate in interdisciplinary and specialized committees, thereby allowing members of the

NRC to complete other duties.

The structure of the component panels and commissions, however, is less clear. Fewer interviewees had participated directly in panels and commissions, and their views vary widely. Even so, it generally appears that while these groups are often composed and structured more informally than the NRC as a whole, they function adequately within the overall NRC hierarchy.

One consistent area of dissent from the generally positive statements elicited from interviewees is in the handling of applications for applied sciences and engineering. Multiple interviewees familiar with Division II believe that the long-term, expensive, and somewhat conservative nature of many projects in the physical sciences often conflicts with the emergent, shorter-term, and, possibly riskier, use-oriented and applied projects. The two types of projects compete for funding, and the perception exists that a disproportionately small number of use-oriented projects are funded as a result.

14. *Does the division of tasks within and between the National Research Council and the Secretariat facilitate or inhibit the SNSF goals of supporting excellent research and ensuring evaluation procedures are fair and unbiased?*

Both members of the NRC and Secretariat are largely satisfied with the division of tasks between the two groups. In particular, members of the NRC are highly satisfied with the work done by the Secretariat, and personnel within the Secretariat are comfortable with the scope of their work supporting the members of the NRC.

However, the workload undertaken by members of the NRC is becoming less manageable. Numerous interviewees suggested measures (some of which are enumerated in the 'Recommendations' section of this report) that are not currently implemented widely, but if conducted consistently would relieve some of the current burden on the NRC and further facilitate the goals of the SNSF.

15. *Does communication within and between the National Research Council and the Secretariat facilitate or inhibit the SNSF goals of supporting*

excellent research and ensuring evaluation procedures are fair and unbiased?

Communication within and between members of the NRC and the Secretariat is almost universally satisfactory to all involved parties. Relations between the two groups are uniformly respectful and collegial. Furthermore, members of the NRC feel that the Secretariat is intelligent, well educated, and performs indispensable duties, and the Secretariat is fully committed to supporting the NRC in meeting the mission and objectives of the SNSF.

Targets, Criteria, Guidelines, and Processes

16. *Do the evaluation criteria, processes, and related documents facilitate or inhibit the goals of the SNSF?*

The evaluation criteria, processes, and related documents were a nebulous concept for most members of the NRC. General evaluation criteria, shared between divisions and varying by funding instrument, are frequently acknowledged, but many NRC interviewees are unaware of or unsure about the existence of formal evaluation criteria and guidelines. Members of the Secretariat, conversely, are much more consistently aware of available documentation. This dichotomy makes it difficult to ascertain whether the criteria, processes, and documents facilitate or inhibit the SNSF's goals as much of the current transmission of this information to new members of the NRC currently occurs through an irregular, unsystematic, and often tacit, communication process of informal norms within each division.

The evaluation process itself, however, appears to create results with which members of the NRC are relatively well satisfied. That is, members of the NRC consistently perceive that they are able to support the best applications submitted each semester, and typically describe the SNSF's national and international reputation in ways that support their perceptions.

In general, applicants for SNSF funding perceive the 'overall quality' of evaluations of their applications by the SNSF as 'high quality' (65.77%) or 'very high quality' (13.91%). Statistically, fewer applicants, however, view the

'overall quality' of evaluations of their applications by the SNSF as 'very low quality' (2.31%) or 'low quality' (17.99%) ($X^2 [df = 3, N = 215] = 200.38, p < .01$). Moreover, contrasting proposal evaluation quality with funding (with 'ever funded' as the referent) there is a statistically significant higher proportion of funded applicants who rate the quality of SNSF evaluations as 'high quality' or 'very high quality' compared to unfunded applicants ($X^2 [df = 3, N = 215] = 16.34, p < .01$).

Applicants agreement (or disagreement) that applying the criteria of 'scientific track record,' 'expertise,' 'scientific relevance,' 'originality,' 'topicality,' 'broader impact,' 'suitability of methods,' and 'feasibility' to applications, support work towards meeting the objectives of the SNSF, vary widely, in particular as related to junior/young and female researchers.

Evaluation Criteria and Objectives	Strongly Disagree	Disagree	Agree	Strongly Agree
Scientific Track Record				
Supporting excellent research in all disciplines	1.51% (1.02%, 0.51%)	11.09% (7.11%, 4.06%)	59.57% (40.61%, 18.78%)	27.82% (19.80%, 8.12%)
Supporting scientifically relevant research	2.00% (1.52%, 0.51%)	16.58% (10.10%, 6.06%)	55.21% (35.35%, 20.20%)	26.18% (21.63%, 4.55%)
Supporting scientifically original research	3.04% (2.04%, 1.02%)	27.41% (17.86%, 9.18%)	44.65% (30.10%, 14.80%)	24.88% (19.39%, 5.61%)
Increasing the international competitiveness of Swiss research	1.00% (1.01%, 0.00%)	9.55% (6.06%, 3.54%)	55.73% (35.86%, 19.70%)	33.70% (25.76%, 8.08%)
Increasing the international competitiveness of researchers in Switzerland	1.50% (1.01%, 0.51%)	14.57% (9.60%, 5.05%)	51.72% (34.34%, 17.17%)	32.19% (23.74%, 8.59%)
Supporting junior/young researchers	11.95% (5.24%, 6.28%)	33.87% (25.65%, 8.38%)	32.29% (23.04%, 9.42%)	21.88% (15.71%, 6.28%)
Supporting female researchers	8.21% (3.31%, 4.42%)	29.11% (20.44%, 8.84%)	47.26% (34.25%, 13.26%)	15.39% (11.60%, 3.87%)
Expertise				
Supporting excellent research in all disciplines	0.52% (0.52%, 0.00%)	10.92% (5.76%, 5.24%)	60.94% (42.93%, 17.80%)	26.61% (18.85%, 8.90%)
Supporting scientifically relevant research	1.03% (1.04%, 0.00%)	12.43% (7.81%, 4.69%)	63.17% (42.19%, 20.83%)	25.35% (16.67%, 6.77%)
Supporting scientifically original research	2.58% (2.07%, 0.52%)	19.58% (13.47%, 6.22%)	53.07% (35.23%, 17.62%)	24.76% (17.10%, 7.77%)
Increasing the international competitiveness of Swiss research	1.03% (1.04%, 0.00%)	12.85% (7.25%, 5.70%)	58.23% (38.86%, 19.17%)	27.87% (20.73%, 7.25%)
Increasing the international competitiveness of researchers in Switzerland	1.03% (1.04%, 0.00%)	13.39% (8.81%, 4.66%)	59.25% (38.86%, 20.21%)	26.32% (19.17%, 7.25%)
Supporting junior/young researchers	2.13% (0.54%, 1.61%)	30.46% (21.51%, 9.14%)	43.85% (30.65%, 12.90%)	23.53% (16.13%, 7.53%)
Supporting female researchers	2.79% (1.13%, 1.69%)	22.46% (14.69%, 7.91%)	59.93% (38.42%, 15.25%)	20.80% (14.69%, 6.21%)
Scientific Relevance				
Supporting excellent research in all disciplines	2.09% (0.53%, 1.59%)	17.33% (8.47%, 8.99%)	53.15% (39.68%, 13.76%)	27.40% (18.52%, 8.47%)
Supporting scientifically relevant research	0.52% (0.53%, 0.00%)	9.91% (4.74%, 5.26%)	46.58% (30.53%, 16.32%)	42.97% (31.58%, 11.05%)
Supporting scientifically original research	3.67% (2.12%, 1.59%)	22.09% (13.23%, 8.99%)	47.89% (34.92%, 12.70%)	26.33% (17.46%, 8.99%)
Increasing the international competitiveness of Swiss research	0.00% (0.00%, 0.00%)	12.67% (5.85%, 6.91%)	60.27% (42.02%, 18.09%)	27.04% (19.68%, 7.45%)
Increasing the international competitiveness of researchers in Switzerland	0.00% (0.00%, 0.00%)	14.80% (7.98%, 6.91%)	57.61% (39.36%, 18.09%)	27.57% (20.21%, 7.45%)
Supporting junior/young researchers	1.62% (0.55%, 1.09%)	18.45% (10.38%, 8.20%)	58.69% (40.44%, 18.03%)	21.22% (16.94%, 4.37%)
Supporting female researchers	3.44% (1.73%, 1.16%)	18.35% (9.25%, 9.25%)	59.19% (42.77%, 16.76%)	19.00% (15.03%, 4.05%)
Originality				

Evaluation Criteria and Objectives	Strongly Disagree	Disagree	Agree	Strongly Agree
Supporting excellent research in all disciplines	1.56% (1.58%, 0.00%)	13.09% (6.84%, 6.32%)	50.74% (35.79%, 15.26%)	34.60% (24.21%, 10.00%)
Supporting scientifically relevant research	1.56% (1.58%, 0.00%)	16.22% (10.00%, 6.32%)	53.87% (35.26%, 18.95%)	28.32% (21.58%, 6.32%)
Supporting scientifically original research	1.05% (0.53%, 0.53%)	8.93% (5.82%, 3.17%)	38.91% (25.40%, 13.76%)	51.09% (37.04%, 13.76%)
Increasing the international competitiveness of Swiss research	1.56% (1.05%, 0.53%)	10.46% (6.32%, 4.21%)	52.81% (33.16%, 19.47%)	35.15% (27.89%, 7.37%)
Increasing the international competitiveness of researchers in Switzerland	1.05% (0.53%, 0.53%)	13.69% (8.47%, 5.29%)	50.46% (33.86%, 16.40%)	34.79% (25.93%, 8.99%)
Supporting junior/young researchers	2.68% (1.62%, 1.08%)	13.45% (8.11%, 5.41%)	53.72% (37.30%, 16.22%)	30.13% (22.16%, 8.11%)
Supporting female researchers	2.81% (1.14%, 1.14%)	17.63% (10.29%, 7.43%)	56.76% (40.00%, 17.14%)	22.76% (17.71%, 5.14%)
Topicality				
Supporting excellent research in all disciplines	3.89% (2.79%, 1.12%)	28.88% (20.67%, 7.82%)	54.98% (35.20%, 20.11%)	12.24% (8.94%, 3.35%)
Supporting scientifically relevant research	2.21% (1.67%, 0.56%)	22.66% (16.67%, 5.56%)	60.73% (38.33%, 22.78%)	14.38% (11.11%, 3.33%)
Supporting scientifically original research	4.47% (2.81%, 1.69%)	28.88% (23.60%, 6.74%)	54.98% (32.02%, 19.10%)	12.24% (9.55%, 4.49%)
Increasing the international competitiveness of Swiss research	2.78% (2.23%, 0.56%)	18.31% (12.29%, 6.15%)	63.86% (41.90%, 21.79%)	15.03% (11.73%, 3.35%)
Increasing the international competitiveness of researchers in Switzerland	2.72% (2.21%, 0.55%)	20.32% (13.81%, 6.63%)	59.86% (39.78%, 19.89%)	17.05% (12.15%, 4.97%)
Supporting junior/young researchers	5.74% (2.89%, 2.89%)	26.99% (17.92%, 8.67%)	54.59% (37.57%, 17.34%)	12.66% (9.83%, 2.89%)
Supporting female researchers	6.57% (3.01%, 3.01%)	28.73% (18.67%, 10.24%)	53.89% (38.55%, 15.66%)	10.79% (7.83%, 3.01%)
Broader Impact				
Supporting excellent research in all disciplines	4.88% (3.83%, 1.09%)	27.68% (19.67%, 8.20%)	53.26% (35.52%, 17.49%)	14.16% (10.38%, 3.83%)
Supporting scientifically relevant research	2.17% (2.19%, 0.00%)	29.90% (18.58%, 5.46%)	53.25% (33.33%, 19.67%)	20.67% (15.30%, 5.46%)
Supporting scientifically original research	5.46% (4.95%, 0.55%)	34.43% (25.82%, 8.79%)	44.77% (28.02%, 16.48%)	15.32% (10.44%, 4.95%)
Increasing the international competitiveness of Swiss research	2.14% (2.16%, 0.00%)	19.88% (14.59%, 5.41%)	58.03% (36.76%, 21.08%)	19.93% (15.68%, 4.32%)
Increasing the international competitiveness of researchers in Switzerland	2.14% (2.16%, 0.00%)	24.73% (17.30%, 7.57%)	52.65% (34.59%, 17.84%)	20.46% (15.14%, 5.41%)
Supporting junior/young researchers	4.43% (3.35%, 1.12%)	33.89% (24.58%, 9.50%)	49.43% (31.84%, 17.32%)	12.23% (10.06%, 2.23%)
Supporting female researchers	4.63% (3.51%, 1.17%)	36.05% (23.98%, 11.70%)	48.26% (32.75%, 15.79%)	11.05% (9.36%, 1.75%)
Suitability of Methods				
Supporting excellent research in all disciplines	1.61% (1.09%, 0.54%)	9.16% (4.35%, 4.89%)	53.50% (38.04%, 15.76%)	35.71% (24.46%, 10.87%)

Evaluation Criteria and Objectives	Strongly Disagree	Disagree	Agree	Strongly Agree
Supporting scientifically relevant research	2.13% (1.08%, 1.08%)	11.20% (6.45%, 4.84%)	57.23% (40.32%, 17.20%)	29.42% (19.89%, 9.14%)
Supporting scientifically original research	4.29% (2.16%, 2.16%)	17.23% (11.89%, 5.41%)	52.10% (37.30%, 15.14%)	26.36% (16.76%, 9.19%)
Increasing the international competitiveness of Swiss research	1.07% (1.08%, 0.00%)	11.80% (6.49%, 5.41%)	56.44% (38.38%, 18.38%)	30.68% (22.16%, 8.11%)
Increasing the international competitiveness of researchers in Switzerland	1.06% (1.08%, 0.00%)	12.28% (7.53%, 4.84%)	57.73% (38.71%, 19.35%)	28.91% (20.43%, 8.06%)
Supporting junior/young researchers	3.30% (1.67%, 1.67%)	14.89% (10.00%, 5.00%)	58.00% (40.00%, 18.33%)	23.78% (16.11%, 7.22%)
Supporting female researchers	2.86% (1.73%, 1.16%)	18.94% (10.98%, 8.09%)	55.17% (38.15%, 16.76%)	23.02% (17.34%, 5.78%)
Feasibility				
Supporting excellent research in all disciplines	2.14% (1.08%, 1.08%)	13.42% (7.57%, 5.95%)	60.21% (43.24%, 17.30%)	24.21% (15.68%, 8.11%)
Supporting scientifically relevant research	1.60% (0.54%, 1.08%)	15.57% (10.27%, 5.41%)	57.51% (38.92%, 18.92%)	25.30% (18.38%, 6.49%)
Supporting scientifically original research	5.34% (3.76%, 1.61%)	22.44% (12.37%, 10.22%)	52.38% (37.63%, 15.05%)	19.82% (13.98%, 5.38%)
Increasing the international competitiveness of Swiss research	0.53% (0.54%, 0.00%)	13.96% (8.11%, 5.95%)	63.40% (42.16%, 21.62%)	22.09% (16.76%, 4.86%)
Increasing the international competitiveness of researchers in Switzerland	0.54% (0.54%, 0.00%)	16.21% (9.78%, 6.52%)	62.11% (40.76%, 21.74%)	21.12% (16.30%, 4.35%)
Supporting junior/young researchers	2.77% (1.68%, 1.12%)	21.65% (13.97%, 7.82%)	56.10% (39.11%, 17.32%)	19.46% (13.97%, 5.03%)
Supporting female researchers	4.07% (1.76%, 2.35%)	21.61% (12.94%, 8.82%)	56.73% (40.00%, 17.06%)	17.57% (13.53%, 3.53%)

Note. Frequencies in parentheses represent funded and unfunded applicants, respectively.

Note. Percentages may not total 100% due to rounding. Missing data may also cause some disaggregated percentages to vary from those reported in the aggregate analysis.

17. *Are the evaluation criteria, processes, and related documents understandable to applicants, reviewers, and others involved in the evaluation of proposals?*

Interviewees uniformly indicate that few applicants or external reviewers seek explicit assistance before submitting their work to the SNSF, which suggests that the criteria, processes, and documents are, if not necessarily adequate, at least not sufficiently inadequate to provoke frequent questions. If misunderstandings occur, and applicants or external reviewers contact the SNSF for clarification, the Secretariat directly interacts with these individuals.

Overall, external reviewers believe that the information provided in applications is ‘adequate’ (73.03%) for assessing applications. Relatedly, a majority of external reviewers (91.50%) indicated that they read the review guidelines provided by the SNSF prior to completing evaluations of applications and also find the SNSF-provided evaluation guidelines ‘adequate’ ($M = 2.97, SD = 0.48$) for

‘understanding individual review criteria,’ for ‘applying individual review criteria,’ for ‘understanding standards (i.e., grades) applied to individual review criteria,’ for ‘constructing a review narrative,’ and for ‘preparing an “overall” assessment of an application.’

Similarly, applicants generally perceive the SNSF application guidelines to be ‘clear’ or ‘very clear’ ($M = 3.62, SD = 0.49$), documentation ‘easy to understand’ (with 76% indicating ‘yes’ across sub-items; $M = 0.76, SD = 0.23$), and application documentation to be ‘useful’ ($M = 2.86, SD = 0.51$). ‘Clarity,’ ‘ease of understanding,’ and ‘usefulness’ were rated highest for ‘how to select a funding instrument,’ ‘how to prepare an application,’ ‘how to submit an application,’ and ‘how to communicate with the SNSF.’ However, almost half of applicants perceived ‘the evaluation criteria’ and ‘how the evaluation procedure works’ to be ‘unclear’ or ‘very unclear,’ and almost two-thirds of applicants indicated that they are ‘very unclear’ or ‘unclear’ as to how ‘funding decisions are made.’

Adequacy of Evaluation Guidelines (Reviewers)	Inadequate	Somewhat Inadequate	Somewhat Adequate	Adequate
For understanding individual review criteria	0.53%	1.06%	27.27%	71.12%
For applying individual review criteria	0.53%	1.60%	31.01%	66.84%
For understanding standards applied to review criteria	1.61%	2.15%	31.72%	64.51%
For constructing a review narrative	1.63%	1.63%	33.69%	63.04%
For preparing an “overall” assessment of an application	1.09%	2.19%	31.86%	64.83%
Clarity of Application Guidelines (Applicants)	Very Unclear	Unclear	Clear	Very Clear
How to select a funding instrument	1.83%	8.76%	52.50%	36.88%
How to prepare an application	0.91%	5.50%	51.35%	42.22%
How to submit an application	0.92%	0.46%	43.94%	54.66%
The evaluation criteria	8.32%	36.06%	44.91%	10.69%
How the evaluation procedure works	10.75%	39.19%	39.75%	10.30%
How funding decisions are made	21.94%	43.90%	26.17%	7.97%
How to communicate with the SNSF	2.74%	7.33%	43.59%	46.33%

Note. Percentages may not total 100% due to rounding.

A relatively large proportion of applicants perceive documentation about ‘evaluation criteria,’ ‘how the evaluation procedure works,’ and ‘how funding decisions are made’ as

difficult to understand (40.70%, 43.18%, and 54.81%, respectively). The same documents also were perceived to be the least useful; in particular as regards ‘the evaluation criteria’

(50.40%), ‘how the evaluation procedure works’ (55.70%), and ‘how funding decisions are made’ (66.89%).

Ease of Understanding Application Documentation	Yes	No
How to select a funding instrument	86.98% (59.92%, 27.00%)	13.01% (7.59%, 5.49%)
How to prepare an application	92.48% (63.03%, 29.41%)	7.51% (4.62%, 2.94%)
How to submit an application	94.47% (65.55%, 31.93%)	2.52% (2.10%, 0.42%)
The evaluation criteria	59.29% (42.19%, 16.88%)	40.70% (25.32%, 15.61%)
How the evaluation procedure works	56.81% (43.40%, 13.19%)	43.18% (24.26%, 19.15%)
How funding decisions are made	45.18% (33.90%, 11.02%)	54.81% (33.90%, 21.19%)
How to communicate with the SNSF	91.20% (62.45%, 28.69%)	8.79% (5.06%, 3.80%)

Note. Frequencies in parentheses represent funded and unfunded applicants, respectively.

Note. Percentages may not total 100% due to rounding. Missing data may also cause some disaggregated percentages to vary from those reported in the aggregate analysis.

As regards the utility of the SNSF’s application documentation, applicants generally find application documentation ‘useful’ or ‘very useful.’ Some, however, find certain aspects of the application documentation less useful; in particular as regards ‘the evaluation criteria,’ ‘how the evaluation procedure works,’ and ‘how funding decisions are made.’

Usefulness of Application Documentation	Not at all Useful	Somewhat Useful	Useful	Very Useful
How to select a funding instrument	0.85% (0.43%, 0.43%)	17.58% (10.78%, 6.90%)	56.64% (40.09%, 16.38%)	24.90% (16.38%, 8.62%)
How to prepare an application	0.43% (0.43%, 0.00%)	8.21% (3.91%, 4.35%)	49.32% (34.35%, 14.78%)	42.02% (28.70%, 13.48%)
How to submit an application	0.42% (0.00%, 0.43%)	2.58% (2.16%, 0.43%)	46.52% (31.17%, 15.15%)	50.45% (34.20%, 16.45%)
The evaluation criteria	14.14% (6.67%, 7.56%)	36.26% (24.89%, 11.11%)	38.05% (29.33%, 8.89%)	11.53% (6.67%, 4.89%)
How the evaluation procedure works	19.44% (8.00%, 11.56%)	36.26% (26.22%, 10.22%)	35.41% (26.22%, 8.89%)	8.88% (6.67%, 2.22%)
How funding decisions are made	32.57% (17.70%, 15.04%)	34.32% (25.22%, 8.85%)	25.57% (19.47%, 6.19%)	7.52% (5.31%, 2.21%)
How to communicate with the SNSF	2.16% (0.87%, 1.31%)	9.53% (5.24%, 4.37%)	51.79% (39.74%, 11.79%)	36.50% (21.83%, 14.85%)

Note. Frequencies in parentheses represent funded and unfunded applicants, respectively.

Note. Percentages may not total 100% due to rounding. Missing data may also cause some disaggregated percentages to vary from those reported in the aggregate analysis.

18. *Are the decisions that result from the evaluation process transparent and comprehensible to applicants?*

The number of dissatisfied applicants who communicate with the Secretariat is relatively low (proportional to the total number of applications submitted at any given time) — typically, one to three per scientific collaborator per semester in Divisions I, II, and III. The usual request, described by interviewees, is from an applicant seeking further explanation or explication of the reasoning underlying a particular funding decision. Many interviewees had no experience with applicants who appealed funding decisions, suggesting that the number of appeals is very low overall. In summary, interviewees suggest (but do not conclusively demonstrate) that decisions arising from the evaluation process are adequately understood by a majority of applicants.

In contrast, Division IV, which manages funding instruments that are substantially different from typical project applications, evaluates far fewer applications and receives considerably fewer requests for clarification.

Applicants indicated that the feedback received from the SNSF for their most recent application was ‘easily understood’ (79.44%), ‘useful’ (67.26%), ‘impartial’ (66.18%), ‘constructive’ (60.75%), and ‘sufficiently detailed’ (56.76%). Nonetheless, 65.84% of applicants are ‘unclear’ as to how funding decisions are made within the SNSF.

19. *Overall, are the SNSF criteria and evaluation processes biased toward or against funding particular research fields, methodologies, designs, or approaches?*

According to the authors of the 2001 external evaluation report of the SNSF (Denis et al., 2001), certain types of research, particularly in applied and use-oriented sciences, are weakly supported by the SNSF. This conclusion, however, is incongruent with the perspectives provided by interviewees and through analysis of other information (from the SNSF and elsewhere).

The most frequently mentioned source of bias

amongst NRC interviewees is that evaluations in one discipline are sometimes consistently more critical of their peers and colleagues relative to evaluations in another. Some interviewees attributed this to an instinct to defend subjects (e.g., mathematics, from criticism coming from outside the field); whereas others believed that it results from widely varying critical traditions within and between disciplines.

Less frequently discussed, but of possibly greater concern, is a very likely bias toward funding long-term research projects, such as international projects in the physical sciences and long-term medical or biological studies. Some interviewees described these projects as systematically more likely to receive funding than a typical application, for reasons of both quality (most have been subject to prior review and revision by bodies constituted from other experts in the field) and international politics. Accordingly, these projects are perceived as competing unfairly with projects less well established, smaller in scope, and potentially more innovative.

Other interviewees described possible biases originating from preferences or prejudices of individual referees, who have substantial discretion in their selection of reviewers and presentation of the strengths of a particular proposal, but it is unlikely that these biases distort the overall results of the SNSF evaluation process.

Applicants, when asked “Based on your most recent application, are the following types of applications more favored (i.e., more likely to receive funding) than others by the SNSF evaluation procedure?,” generally believe that applications from ‘particular groups of researchers’ (61%) and from ‘certain disciplinary areas’ (53%) are favored for funding by the SNSF (e.g., “...the SNSF tends to favor more conservative research approaches,” “...in the SNSF, natural sciences receive greater funding than the social sciences or humanities,” “...research groups with well-established reputations are often given special status,” “...theoretical or basic research is not sufficiently funded by the SNSF”). Simultaneously, applicants generally do not

believe that ‘high risk, high reward research’ (79%), ‘applied or use-oriented research’ (72%), or ‘particular research approaches’ (51%) are systematically favored by the SNSF.

20. *Within SNSF funding schemes that employ a two-tiered evaluation procedure, does the two-tiered structure facilitate or inhibit identification of superior proposals?*

Two-tiered evaluation structures are insufficiently represented in the document sample to draw valid conclusions about their effectiveness. However, the guidelines for members of the NRC indicate that even in the general case, “manifestly inadequate” applications or applicants who “are not able to show that they are capable of carrying out the proposed project” can be disqualified prior to external review (Swiss National Science Foundation, 2011b, p. 4). In essence, these exclusionary criteria appear to amount to an unofficial first-tier of evaluation for all applications

Interviewees, in both the NRC and Secretariat, who work with funding schemes that feature two-tiered procedures universally describe two-tiered evaluation procedures as more efficient and effective for meeting the demands of certain instruments than a more typical one-tiered process. For professorships, for instance, it simply is not feasible for the NRC to interview all applicants without hiring additional external members of review committees or applying a quota to the applicant pool.

21. *Are there funding schemes that should employ a two-tiered evaluation procedure, but currently do not?*

Interviewees typically indicated that a two-tiered evaluation procedure would be inappropriate for those schemes that do not currently use it. However, Division III was a frequent and notable exception. For Division III, both members of the NRC and scientific collaborators described using a process of “direct rejection” for project funding, in which the Secretariat directly compares applications to a set of basic criteria (i.e., criteria regarding the researcher, such as ‘track record’), and, therefore, invites some

applicants to withdraw their applications before formal external evaluation. Accordingly, the overwhelming perspective of Division III was that other divisions should consider adopting this procedure for their project funding.

22. *Does the comparatively high acceptance rate of follow-up applications facilitate or inhibit the goal of supporting excellent research?*

In addition to the reportedly high acceptance rate for follow-up applications (as described in an internal SNSF report [Swiss National Science Foundation, 2011a]), some such applications frequently receive evaluation by a “simplified procedure,” which is not attested to except in the *Guidelines for the Assessment of Applications by Members of the Research Council: Project Funding* (Swiss National Science Foundation, 2011b). In the documents included in the sample, follow-up applications are not discussed independently of other applications.

Moreover, interviewees indicated an important difference between prolongation grants and continuation grants. Prolongation grants are often handled by the Secretariat and are frequently granted due to time discrepancies between grant activities and grant time span. As for continuation grants, Division II is the only division for which interview data inform continuation grants. These grants are scheduled for periodic review, but can also be scheduled for review sooner if a referee has reservations. Often, a differentiation is made between “large” projects that have proven leadership, and may be politically supported to be continued in this manner. Large projects tend to ‘play it safe,’ but are productive in regards to publications and support of large laboratories. Relatedly, innovative research tends to originate from young researchers who are initially funded at more conservative levels relative to large projects and which are checked for results before receiving further funding. Interviewees appear confident that the SNSF’s evaluation procedures are sufficiently sensitive for determining when to discontinue funding support.

23. *Should there be separate evaluation criteria for follow-up and new applications?*

In addition to the high acceptance rate for follow-up applications (as described in *Half-Yearly Statistics of Project Funding: Summer Semester 2011* [Swiss National Science Foundation, 2011a]), the document review indicated that some follow-up applications are evaluated by a “simplified procedure,” which is mentioned only in one internal SNSF report (Swiss National Science Foundation, 2011b). In the documents included in the sample for review, follow-up applications are not discussed independently of other applications.

Interviewees, however, indicate that most follow-up applications are submitted by experienced, well-known researchers who tend to have projects in large, well-established research units, which often have national or international political support. Funding these types of applications generally incurs little scientific risk. Simultaneously, experienced researchers, who are reliably productive — even if they are unlikely to be innovative — frequently continue to be funded, although sometimes at a lower level.

According to interviewees, follow-up projects are reviewed at least every other cycle or every five years, but may not receive external review for each funding application. This can occur if the referee and/or the respective council members believe that a particular project needs more careful scrutiny, and the practice varies among divisions. Project reports, publications, and other monitoring activities play a small role in this decision-making process and it is unclear, from interviewees, what other factors are involved in these decisions.

By analogy to a personal or organizational investment portfolio, divisions that frequently fund continuing applications may be interested in balancing high-risk, high-return investments with low-risk ones — even if the returns are more moderate. However, this pattern of funding incorporates a substantial bias toward the funding of experienced researchers and well-known projects or research units, at the possible expense of junior researchers and innovative research. It also indicates that the evaluation criteria are tacitly understood to be different for

continuing or follow-up applications than for new applications.

Accordingly, it appears that this process — while not undesirable based on the perception of scientific risk by members of the NRC — fails to facilitate the SNSF’s goals of ensuring a fair and unbiased evaluation process and supporting scientifically original research. Formalizing the existence of this separate set of criteria for follow-up applications, although the NRC would continue to evaluate follow-up applications according to their current practices, would more clearly support these goals. Additionally, it would allow the SNSF presidium or the component divisions of the NRC to more easily and clearly allocate funding between the two broad risk profiles.

24. *Does the external review process provide enough information on the scientific merit of proposals for referees to make fair recommendations?*

The SNSF provides general guidance to external reviewers regarding the assignment of objective marks (i.e., grades) and, in particular, regarding the desired distribution of marks to applications (with concerted efforts to increase the transparency and systemization of this procedure occurring in 2011). This has resulted in an overall improvement in the variance of marks, although levels of improvement, and the underlying distributions themselves, appear to vary substantially by content division (Swiss National Science Foundation, 2011b).

Generally, interviewees indicated that there is a consistent lack of variability in quality ratings of applications (i.e., marks) within divisions, which makes it difficult to distinguish applications that should be funded from those that should not be funded or, sometimes more importantly, to rank order applications.

Particular problems that interviewees identified include gaps between positive ratings provided by external reviewers that are not always reflected in the corresponding narratives as well as in cursory, low quality reviews that are positive overall but lack any substantive feedback to justify positive reviews by external reviewers.

A majority of interviewees noted that it is the responsibility of referees and co-referees to evaluate a particular proposal and the assessments provided by external reviewers, no matter the quality of external reviews, and to elicit feedback via “arguments” (e.g., in the application review meeting) to reach a funding decision.

Interviewees generally believed that they were able to make fair, unbiased recommendations regardless of the usefulness or quality of external reviews. When needed, they conduct their own assessment of an application to augment the lack of information provided by the external review process. Instead, the problem consistently cited by both administrative staff and councilors is the difficulty of communicating a negative result to an applicant when the external reviews are of the very common overly positive ilk. This creates problems of inconsistency between the external reviews and the final judgment.

Transparency and Comprehensibility

25. *Are external reviewers, referees, co-referees, and others involved in the evaluation of proposals acting in a manner consistent with the goals and guidelines of the SNSF?*

In an internal SNSF report (Swiss National Science Foundation, 2012b), the practices of external reviewers nominated by applicants as part of a “positive list” are described. According to the report, reviews which result from this practice tend to give significantly better grades (i.e., ‘marks’), providing limited evidence suggesting that the quality of applications may not be the primary source of ‘marks’ in the case of positive lists provided by applicants for external reviewers.

Interviewees indicated a very high professional regard between councilors and scientific collaborators, and vice versa, which is suggestive of consistent understandings of their mutual evaluation mission. The manner in which referees and co-referees rely on each other also adds a layer of checks and balances, which is reported to work well in aligning evaluation work with the overall mission and objectives of the SNSF.

26. *What implicit practices guide the evaluation process other than the goals and guidelines of the SNSF?*

Implicit evaluation practices, as described by interviewees, are guided and informed by the SNSF’s explicit goals, objectives, and values, and exist when policies and guidelines are not fully explicit or do not cover an issue. These practices vary by division. The implicit practices that arose from interviewees commonly include concerns related to the reasonableness of monetary requests, as well as ceilings, if and how many simultaneous projects can and should be funded, how to fund large, continuous grants along with normal project funding, the true independence of young researchers, and the potential overlap of project funding requests.

27. *What are the intended and unintended effects of providing feedback to applicants who are not funded?*

The most frequently reported effects by interviewees of providing feedback to applicants are subsequent revisions, which result in ‘follow-up’ submissions. According to interviewees, this can be problematic if a proposal is poorly conceived or is otherwise fundamentally flawed. In such cases, detailed feedback merely generates unreasonable expectations or false hopes that an application will be funded if a few revisions are made, which indirectly serves to increase the workload of the SNSF.

Another unintended consequence arises from tensions between external reviewer evaluations of application quality and funding decisions. For example, many interviewees indicated that external evaluations consistently contain overly positive ratings, which frequently do not match corresponding narrative reviews. As a result, reasons for rejecting an application often surface from oral arguments during sessions of the NRC. These arguments must then be summarized and communicated to applicants in a letter of rejection. Accordingly — from the point of view of applicants — such letters can potentially contain mixed messages; especially is an application is rejected in spite of largely positive reviews. Interviewees who cope with these applicants describe perceptions of lack of

transparency, resulting in skepticism and even mistrust of the overall evaluation procedure by rejected applicants.

28. *How could the communication of decisions be improved to better facilitate the SNSF goal of supporting excellent research?*

The current practice of the SNSF includes careful crafting of a rejection letter by a scientific collaborator derived from the minutes of the session of the NRC (generally with the input and approval of the application referee). Interviewees indicate that relatively few applicants (i.e., a low percentage of all applicants, overall) contact the SNSF Secretariat for clarification or further information about rejected applications, which suggests — but does not demonstrate — that most applicants are satisfied with the current level of communication.

The most typical case reported by interviewees, in which applicants contact the SNSF regarding funding decisions, occurs when rejection letters include substantial content from positive external evaluations, indicating a discrepancy between evaluation ‘marks’ (or, ‘grades’) and funding decisions.

Moreover, and as previously discussed, applicants indicated that the feedback received from the SNSF for their most recent application was ‘easily understood’ (79.44%), ‘useful’ (67.26%), ‘impartial’ (66.18%), ‘constructive’ (60.75%), and ‘sufficiently detailed’ (56.76%). Nonetheless, nearly two-thirds (65.84%) of applicants are ‘unclear’ as to how funding decisions are made within the SNSF.

Impacts

29. *Does the large number of funding schemes offered by the SNSF create artificial demand for funding, or do the schemes instead meet existing demands (i.e., as new funding schemes are created, do new people submit proposals, or do the same people submit proposals to new funding schemes)?*

Some members of the NRC reported that introducing new funding schemes, or instruments, creates substantial overlap between new and existing funding schemes, or

instruments, which simultaneously generates confusion for both applicants and those responsible for evaluating applications, as well as an increased burden on external reviewers, referees, and co-referees. Relatedly, others believe that recent introductions of new funding schemes have been motivated by political considerations rather than scientific needs. Simultaneously, many members of the NRC have called for simplifying the SNSF’s funding schemes, as some instruments are no longer considered relevant.

That being said, and while understanding is universal that adding more instruments increases complexity and cost, interviewees from each division and some committees indicated a clear need for further schemes in their area of work. For example, in Careers it was noted that a “returning” funding instrument (outside of Ambizone) would help to mitigate a potential brain drain in Switzerland. In Division II, for instance, splitting “big” research from project funding was a common theme.

In addition, applicants for SNSF funding indicated that they would be ‘likely’ (56.02%) or ‘very likely’ (21.27%) to submit applications for funding when, and if, new instruments related to their research areas are made available.

30. *To what extent are funding decisions based on the past experience of the researcher, rather than the potential of the research as outlined in the application (i.e., does the SNSF prioritize funding experienced researchers rather than researchers with new ideas)?*

Interviewees indicated that research and publication records of applicants (e.g., journal impact factors and citation rates; Coryn, 2006) are crucial indicators of whether providing funding for an application is likely to be productive. As such, the ‘qualifications’ of applicants, often translated by quantity of publications and citations, are given serious consideration in the evaluation process. Interviewees indicated this to be especially true of Division II, III, and IV. Division I, according to some interviewees, is considered an exception due to disciplinary differences in how publications are “categorized” and “counted.”

They (i.e., Division I) prefer evaluation of projects, although they do also consider the researcher. In Division II apparently there is a schism between ‘young’ researchers who are expected to generate innovative proposals and more established researchers who should have a more established track record of managing productive laboratories that include important and continuing publications as well as other research outputs. Division III, conversely, is more lenient toward younger researchers in regard to lack of track record, but simultaneously attempts to balance innovative ideas with productivity. Moreover, researcher independence is also a very important criterion in Division III.

31. *Does the evaluation process result in systematically lower acceptance rates or funding levels for some groups of researchers (e.g., young researchers, female researchers, type of institution)?*

Analysis of unduplicated applicants from the SNSF-provided database *across all funding instruments* — including funding instruments specifically devoted to young and female researchers, conferences, and publications, for example — ($N = 26,418$ applications usable for analysis) indicated that 63.20% of all applications are funded. Of these, 71.56% were submitted from male applicants, when applicant’s age was dichotomized by approximate chronological age (i.e., applicants less than 40 years of age were classified as ‘young researchers’) about two-thirds of applications were submitted from ‘older’ applicants (66.83%), and 21.21% of applications were classified as a ‘continuation’ (where ‘continuation’ or ‘follow-up’ and new applications were coded in the SNSF-provided database for analysis in SAS 9.3 using the field labeled ‘AnteriorProjectID,’ when a record was coded as a ‘follow-up application’ if the field had a numeric value or, conversely, coded as a ‘new application’ if a record was empty, per the SNSF’s instructions). Taken together, these basic features of the applicant extant database were further broken down in subsequent analyses; first for the unduplicated full sample and second for a

comparison among divisions ($N_d = 11,681$). Importantly, applications rather than unique applicants (i.e., approximately 21.21% of applicants submit more than one application or a request for continuation) were used, so application demographics are not strictly representative of applicants.

Analysis of applications by funding status and gender revealed that there was a small, but statistically significant, association between funding status and gender ($X^2 [df = 1, N = 26,418] = 13.15, p < .01$), suggesting that male applicants have a marginally better funding record (63.87%) than female applicants (61.49%). However, the effect of gender on funding is extremely small ($\phi = -0.02$) and the X^2 test is known to be overly sensitive in large sample sizes (Cohen, 1988, 1992). However, OR = 0.90 (LL = 0.85, UL = 0.95, $p < .01$) attests to a small, but statistically significant, effect that being a female applicant represents a significant risk for a positive funding decision.

Analysis of the relationship between funding status and dichotomized age of applicants (i.e., dichotomized as less than 40 years of age and equal to or greater than 40 years of age) revealed that there is a small, but statistically significant, association between funding status and age ($X^2 [df = 1, N = 26,418] = 26.45, p < .01$), suggesting that younger applicants have a marginally better funding record (65.36%) than older applicants (62.12%). However, the effect of age on funding was extremely small ($\phi = 0.03$). For this effect, OR = 1.15 (LL = 1.09, UL = 1.21, $p < .01$), indicating younger applicants are more likely to be funded, by a small but statistically significant probability. Notably, the average age of applicants — across all funding instruments between 2006 and 2011 — was $M = 45.83$ ($SD = 10.46$).

Applications classified as ‘continuation’ proposals (or ‘follow-up’), of which 77.98% were funded, while only 59.21% of ‘non-continuation’ proposals were funded, overall ($X^2 [df = 1, N = 26,418] = 668.45, p < .01$), had an OR = 2.44 (LL = 2.28, UL = 2.61, $p < .01$), suggesting a moderately large effect of application type on funding. Continuation, or

follow-up, proposals, therefore, are approximately 2.44 times more likely to be funded than non-continuation proposals.

Odds of Funding	OR	95% CI
Female	0.90	(0.85, 0.95)
Age < 40	1.15	(1.09, 1.21)
Follow-up Application	2.44	(2.28, 2.61)

Analysis of funding by institution type — consistent with the SNSF’s classification of institution types (c.f., Swiss National Science Foundation, 2011a, 2012b) — revealed a statistically significant difference in funding patterns across the four major institution types ($\chi^2 [df = 1, N = 23,923] = 223.81, p < .01$). Examination of cell frequencies from the χ^2 analysis indicated that a positive funding outcome was more common for applications emanating from ETH (federal institutes of technology; 66.42%) and Kantonale (cantonal universities; 62.13%) than from Andere (‘other’ types of institutions; 50.46%) and Fachhochschule (universities of applied sciences and teaching universities; 47.92%).

Further investigation of the multinomial classification of institution type, where each type of institution was compared to each of the others (i.e., Andere versus all others, ETH versus all others, Fachhochschule versus all others, and Kantonale versus all others) also revealed statistically significant differences and probabilities of funding between types of institutions. For Andere, OR = 0.61 (LL = 0.55, UL = 0.69, $p < .01$) suggesting that applications to Andere are almost half as likely to be funded as applications from other types of institutions. For ETH, OR = 1.30 (LL = 1.22, UL = 1.38, $p < .01$) indicating applications from ETH are approximately 1.3 times more likely to be funded than applications from other types of institutions. For Fachhochschule, OR = 0.55 (LL = 0.49, UL = 0.62, $p < .01$) which indicates that applications from Fachhochschule are about half as likely to be funded as applications from other types of institutions. Kantonale institutions relative to other types of institutions are about as equally

likely to be funded (OR = 1.05 [LL = 0.99, UL = 1.11, $p = .10$]).

Odds of Funding	OR	95% CI
Andere versus all	0.61	(0.55, 0.69)
ETH versus all	1.30	(1.22, 1.38)
Fachhochschule versus all	0.55	(0.49, 0.62)
Kantonale versus all	1.05	(0.99, 1.11)

In interpreting these analyses, it is important to note that the data analyzed were derived from the SNSF’s extant data on applications and represents unduplicated applications pooled over a six-year period — from 2006 through 2011. The analyses are not derived from a year-to-year cross-sectional analysis, as is often reported in various SNSF reports and official documents (e.g., Swiss National Science Foundation, 2011a), nor do they represent a longitudinal analysis. Therefore, these findings may or may not be congruent with year-to-year findings.

Moreover, many interviewees indicated that the promotion of female researchers and the concerns that surround this inequity stems not from improper SNSF policies, but from larger societal structures in Switzerland. For instance, childcare in Switzerland is not easily accessible and it is a generally accepted societal norm that women care for the household (especially as concerns childcare), while men are more likely to have an uninterrupted, successful career path. In fact, one interviewee described this particular phenomenon as being a “1950’s societal norm.” In addition, interviewees overwhelmingly pointed to a system that can and does self-correct potential biases that sometimes arise from institutional affiliation.

32. *Does the evaluation process result in systematic differences in acceptance rates or funding levels for some groups of researchers (e.g., young researchers, female researchers, type of institution) between the divisions of the National Research Council for project funding?*

A modified replication of the logistic regression analysis reported in an internal SNSF report

(Swiss National Science Foundation, 2011a) using the SNSF-provided applicant database, was conducted on SNSF funding decisions from 2006 through 2011. As suggested by the SNSF, the analysis included only a subset of project funding instruments (see Appendix H).

For the model the criterion variable was funding decision (with funded as the referent). In all, 10 predictor variables were used in the model. The predictors included were gender (with female as the referent), age (treated as a continuous variable), division (with Division III as the referent), institution type (with Kantonale as the referent), application type (with new application as the referent), number of applications submitted by an applicant between 2006 and 2011 (treated as a continuous variable), and year of application (treated as a continuous variable). In total, $N = 11,042$ unique application records with sufficient information on each of the variables were included in the analysis.

Model fit was moderate, with $R^2 = 0.16$, max-rescaled $R^2 = 0.21$, and a statistically significant result for the Hosmer-Lemeshow (H-L) test (H-L = 45.29, $p < .01$). Even so, the c statistic for the model, a measure of the association of predicted probabilities to observed responses, was $c = 0.73$. Given all pairwise comparisons of applications from the applicant dataset, the model correctly predicts 73% of funding decisions.

Overall, female applicants are slightly less likely to be funded relative to male applicants (OR = 0.83). In addition, and although age is statistically significant (OR = 1.00) it is of little practical meaning as the OR for five-year age increments is 1.04, indicating that there is only a very small advantage of funding for older applicants relative to younger applicants (i.e., < 40 years of age).

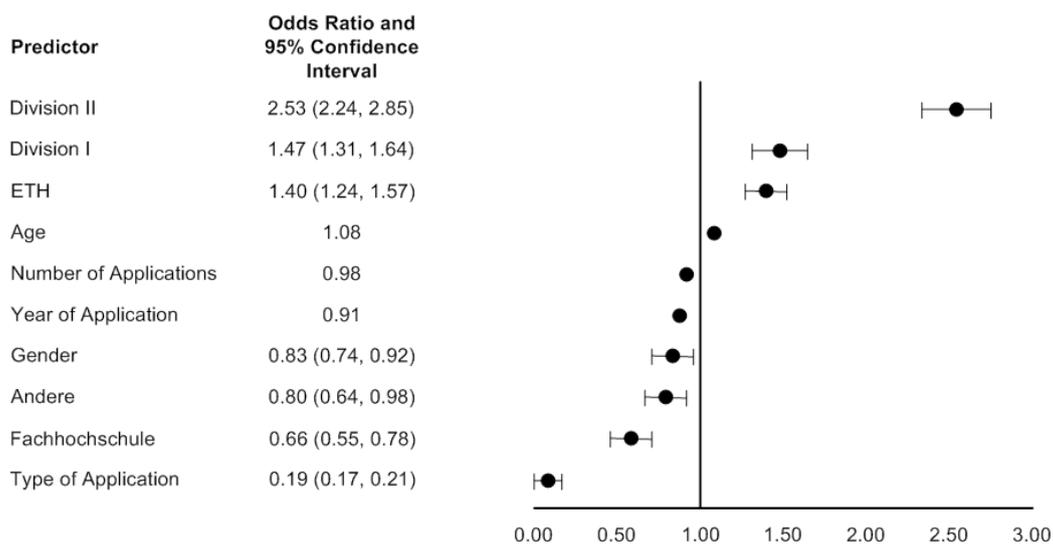
The effects of division and of institution type were statistically significant; therefore, pairwise comparisons between divisions and between institution types were examined. For Division I versus Division II, applications submitted to Division II are more likely to be funded relative to Division I (OR = 0.58). For Division I versus Division III, applications submitted to Division I

are 1.47 times more likely to be funded than an application to Division III. For Division II versus Division III, applications to Division II are 2.53 times more likely to be funded than an application to Division III. Across all divisions, applications submitted to Division II have the greatest likelihood of being funded. For these comparisons each institution type was paired with Kantonale. For Andere versus cantonal universities, the OR = 0.79 indicates that applications from Andere are less likely to be funded than applications from Kantonale. For ETH versus Kantonale, OR = 1.40, indicating that applications from an ETH have a greater probability of funding relative to applications from Kantonale. For Fachhochschule versus Kantonale, OR = 0.66, which indicates that applications from Fachhochschule are less likely to receive funding relative to applications from Kantonale. Overall, applications from ETH have the highest likelihood of being funded, followed by Kantonale, then Andere, and lastly Fachhochschule.

The total number of applications submitted was not statistically significant. However, for new applications OR = 0.19, which, conversely, indicates that follow-up applications are 5.13 times more likely to be funded than new applications. In addition, year of application submission was a statistically significant predictor with an OR = 0.91, which suggests applications from earlier years of the time interval have a slightly better probability of funding.

As previously mentioned, in interpreting these analyses, it is important to note that the data analyzed were derived from the SNSF's extant data on applications and represents unduplicated applications pooled over a six-year period — from 2006 through 2011. The analyses are not derived from a year-to-year cross-sectional analysis, as is often reported in various SNSF reports and official documents (e.g., Swiss National Science Foundation, 2011a), nor do they represent a longitudinal analysis. Therefore, these findings may or may not be congruent with year-to-year findings.

Predictor	β	SE β	Wald's X^2	df	p	OR	95% CI
Intercept	1.2418	0.1625	58.4015	1	< .0001		
Gender	-0.1835	0.0539	11.5772	1	.0007	0.832	(0.749, 0.925)
Age	0.0078	0.0027	8.2788	1	.0040	1.008	
Division I	0.3853	0.0578	44.4405	1	< .0001	1.470	(1.313, 1.646)
Division II	0.9287	0.0621	223.6643	1	< .0001	2.531	(2.241, 2.859)
Andere	-0.2238	0.1068	4.3915	1	.0361	0.800	(0.649, 0.986)
ETH	0.3383	0.0599	31.9041	1	< .0001	1.403	(1.247, 1.577)
Fachhochschule	-0.4149	0.0853	23.6856	1	< .0001	0.660	(0.559, 0.781)
Application Type	-1.6369	0.0548	893.5399	1	< .0001	0.195	(0.175, 0.217)
Number of Applications	-0.0139	0.0074	3.5096	1	.0610	0.986	
Year of Application	-0.0886	0.0117	57.6354	1	< .0001	0.915	
Test			X^2	df	p		
Overall Model Fit							
Likelihood Ratio Test			1949.5789	10	< .0001		
Score Test			1756.4378	10	< .0001		
Wald Test			1514.4450	10	< .0001		
Goodness-of-Fit Test							
Hosmer-Lemeshow			45.2967	8	< .0001		



Considering only Careers (excluding the Marie Heim-Vögtlin funding instrument, which is aimed specifically at female researchers), a logistic regression analysis using the SNSF-provided applicant database was conducted on SNSF funding decisions from 2006 through 2011.

For the model the criterion variable was funding

decision (with funded as the referent). In all, seven predictor variables were used in the model. The predictors included were gender (with female as the referent), age (treated as a continuous variable), institution type (with Kantonale as the referent), application type (with new application as the referent), number of applications submitted by an

applicant between 2006 and 2011 (treated as a continuous variable), and year of application (treated as a continuous variable). In total, $N = 5,770$ unduplicated application records with sufficient information on each of the variables were included in the analysis.

Model fit, however, was poor, with $R^2 = 0.03$, max-rescaled $R^2 = 0.04$, and a statistically significant result for the H-L test (H-L = 57.81, $p < .001$). Even so, the c statistic for the model was $c = 0.61$. Given all pairwise comparisons of applications to Careers, the model correctly predicts 61% of funding decisions.

For Careers, gender was not a statistically significant predictor while all other predictors were statistically significant at $\alpha < .05$. In five-year intervals, the OR for age was 0.79, suggesting that younger applicants are more likely to receive funding relative to older applicants (for funded applicants $M = 36.35$ years of age and for unfunded applicants $M = 38.12$ years of age).

Not submitting an application from Kantonale significantly reduces the likelihood of receiving funding relative to applications from Andere by more than half (OR = 0.46), and for ETH versus Kantonale, applications from Kantonale are approximately 1.3 times more likely to be funded than applications from ETH (OR = 0.78). These findings, in particular the latter, are likely influenced by the fact that Fachhochschule do not offer doctorates (i.e., Ph.D.s) and, therefore, the SNSF Fellowships instrument, with the highest success rate, is not relevant for Fachhochschule (c.f., Swiss National Science Foundation 2011a, 2012a).

New applications are slightly less than half as likely

to be funded (OR = 0.62). This finding, however, should be interpreted cautiously as continuations of SNSF Professorships, for example, are not subjected to the same evaluation procedures as other applications. For year of application, applications submitted in earlier years of the time interval are more likely to be funded (OR = 0.89) and submitting more applications to the SNSF does not significantly increase the probability of funding (OR = 0.96).

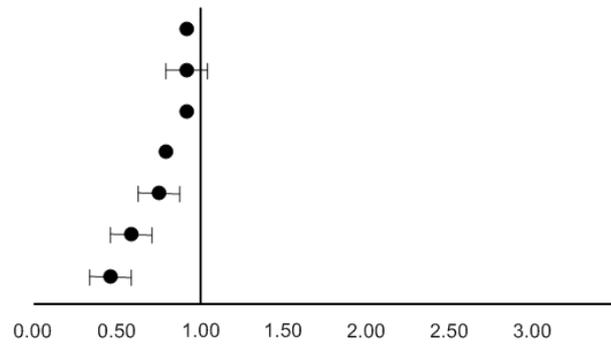
Analysis of funding levels between gender and divisions, using an ANOVA, revealed a main effect for both gender ($F [1,166] = 68.67$, $p < .01$) and division ($F [4,16,685] = 188.48$, $p < 0.01$), but no gender \times division interaction ($p = 0.32$). Overall, male applicants are funded at a significantly higher amount than female applicants (male $M = \text{CHF } 233,477$, female $M = \text{CHF } 178,158$). That being said, the amounts granted for SNSF Professorships, for instance, are much greater than for Fellowships and the proportion of men funded was nearly double for SNSF Professorships than for Fellowships in 2011 (c.f., Swiss National Science Foundation 2011a, 2012a).

As with the logistic model for project funding, it is important to note, in interpreting these analyses, that the data analyzed were derived from the SNSF's extant data on applications and represents unduplicated applications pooled over a six-year period — from 2006 through 2011. The analyses are not derived from a year-to-year cross-sectional analysis, as is often reported in various SNSF reports and official documents (e.g., Swiss National Science Foundation, 2011a), nor do they represent a longitudinal analysis. Therefore, these findings may or may not be congruent with year-to-year findings.

Predictor	β	$SE \beta$	Wald's X^2	df	p	OR	95% CI
Intercept	3.2790	0.2464	177.1438	1	< .0001		
Gender	-0.0397	0.0583	0.4632	1	.4961	0.961	(0.857, 1.077)
Age	-0.0453	0.0049	83.1932	1	< .0001	0.956	
Andere	-0.7643	0.1026	55.4586	1	< .0001	0.466	(0.381, 0.596)
ETH	-0.2398	0.0709	11.4537	1	.0007	0.787	(0.685, 0.904)
Application Type	-0.4731	0.0941	25.2840	1	< .0001	0.623	(0.518, 0.749)
Number of Applications	-0.0311	0.0156	3.9900	1	.0458	0.969	
Year of Application	-0.1127	0.0168	44.8346	1	< .0001	0.893	

Test	X^2	<i>df</i>	<i>p</i>
Overall Model Fit			
Likelihood Ratio Test	204.1498	7	< .0001
Score Test	206.6467	7	< .0001
Wald Test	195.9396	7	< .0001
Goodness-of-Fit Test			
Hosmer-Lemeshow	57.8182	8	< .0001

Predictor	Odds Ratio and 95% Confidence Interval
Number of Applications	0.96
Gender	0.96 (0.85, 1.07)
Age	0.95
Year of Applications	0.89
ETH	0.78 (0.68, 0.90)
Application Type	0.62 (0.51, 0.74)
Andere	0.46 (0.38, 0.59)



Conclusions

Integration, synthesis, and triangulation across methods and subquestions were used to address the six focal evaluation questions. The resulting conclusions suggest that, overall, the SNSF's evaluation policies and procedures promote excellent research, support research that is scientifically relevant and original, increase the competitiveness of Swiss researchers and research, encourage and support the work of young and female researchers, and are impartial and transparent.

Interpreting the Evaluation's Conclusions

The conclusions related to the focal evaluation questions, numbered 1 through 6, were derived through a process of integration, synthesis, and triangulation across evidence derived from the findings related to the each of the evaluation's specific subquestions (i.e., 'conjunctive' triangulation) as more explicitly enumerated in the section of this report titled 'Methods.'

Central Conclusions

1. *To what extent do the SNSF's evaluation procedures and their execution promote excellent research in all disciplines?*

Interviews of actors and key informants internal to the SNSF as well as surveys of applicants for funding and external reviewers of funding applications suggest that the SNSF's existing evaluation procedures serve well in the selection of promising research in all disciplines. However, the increasing workload demands on members of the NRC may inhibit the ability to continue to function at this level in the foreseeable future. These demands stem from increasing numbers of applications submitted for funding as well as consistently increasing numbers of funding instruments. The increased demand on the SNSF for funding, coupled with the SNSF's ability to successfully meet demands for evaluation of applications, indicates that the SNSF is very successful in making reasonable decisions for funding high quality research. That being said, the risk remains, and if not addressed proactively, the question of whether funded research truly represents the most excellent research across all scientific disciplines may become questionable.

Notably, 80% of applicants furnished positive

agreement ('agree' or 'strongly agree') across six of the eight evaluation criteria and objectives under which SNSF applications are evaluated, work toward meeting the objective of *supporting excellent research in all disciplines* ('suitability of methods' 89.21%, 'expertise' 87.55%, 'scientific track record' 87.39%, 'originality' 85.34%, 'feasibility' 84.42%, and 'scientific relevance' 80.55%). Of the remaining two criteria, positive agreement was 67% ('broader impact' 67.42% and 'topicality' 67.22%, respectively). This suggests, from the 'point of view of applicants,' that more can be done to increase the selection of topical research that has broader impacts.

2. *To what extent do the SNSF's evaluation procedures and their execution support research that is both scientifically relevant and original?*

Synthesis of interviews conducted with SNSF actors and key informants suggests that the balance of diverse funding schemes and the promotion of large-scale, multi-year, high- and lower-risk, interdisciplinary, disciplinary, and career-track funding projects, supports a mix of research projects, which are scientifically relevant and original. However, a small minority of interviewees believes that the SNSF may be somewhat conservative in its approach to funding innovative (original) research. This sentiment is reflected in the findings from the surveys of applicants and external reviewers.

3. *To what extent do the SNSF's evaluation procedures and their execution increase the competitiveness of Swiss research and researchers in Switzerland?*

Interviewees overwhelmingly perceive Swiss research and researchers as very competitive, and believe that the evaluation procedures of the

SNSF and their execution support this effort. A relatively large proportion of interviewees and other respondent groups have at least limited experience working internationally (particularly in other French- and German-speaking nations, as well as the United States), and these respondents in particular felt that Swiss research and researchers are highly competitive in the international context.

4. *To what extent do the SNSF's evaluation procedures and their execution encourage the work of junior researchers?*

The SNSF is encouraging junior researchers through a range of funding instruments. In fact, analysis of the applicant database of funding by age, across all funding instruments from 2006 through 2011, yielded a statistically significant association between age and funding, with a larger proportion of 'young' researchers receiving funding than their older counterparts. While the effect of age on funding was extremely small, additional analyses indicated that applicants who are less than 40 years of age are 1.09 times more likely to receive funding than applicants who are 40 or more years of age. Interviewees, however, indicate that there are some questions regarding true independence of young researchers from mentors or other senior scientists as well as a need for further clarifying the evaluation criteria regarding researchers' track record across divisions.

5. *To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation procedures are fair and unbiased?*

Universally, members of the SNSF take the task of supporting a fair and unbiased evaluation process very seriously, and the checks and balances built into the system appear to work well. A comparison of practices and cultures across divisions reveal significant variability grounded in differing research traditions, but these differences and idiosyncratic systems do not appear to inhibit councilors and scientific collaborators from making pragmatic, ethical, sound, and reasonable funding decisions. Analyses of extant data and surveys of applicants and external reviewers further support the perception that procedures are fair and unbiased

whereby this sentiment is less mirrored by applicants who are uncertain about evaluation criteria, procedures, and the decision-making process at large.

6. *To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation decisions are transparent and comprehensible to applicants?*

Substantial efforts are made by the SNSF to ensure that funding decisions are transmitted to applicants and explained in a fashion that supports the retrospective understanding of the reasoning underlying decisions. Most applicants do not contact the SNSF Secretariat for additional clarification. However, some dissatisfied applicants misunderstand or misconstrue communications from the SNSF. As suggested by the fairly large proportion of applicants surveyed who do not fully understand the evaluation criteria, procedures, and ultimately decision making processes, such tensions may result from a lack of clarity about the nature of the SNSF's decision-making (i.e., the distinction between objective evaluation using external review and comparative ranking within a cohort of applications), as well as the purpose of feedback to applicants. In essence, there is room for increasing the transparency of evaluation mechanisms (i.e., the evaluation criteria, procedures, and decision making processes) for those who are not directly involved in the evaluation process.

Recommendations

Recommendations to the SNSF, as regards improving the transparency and overall quality of evaluation at the SNSF, are intentionally minimal and also intended to be realistic, actionable, evidence-based, and low cost.

General Recommendations

The recommendations provided below, in no particular order of importance, are intended to be realistic, actionable, evidence-based, and ‘low cost’ to the SNSF.

1. *Reform the processes and procedures for external evaluations of funding applications.*

External peer review, or evaluation, of applications submitted for funding to the SNSF is crucial to the transparency and fairness of the SNSF evaluation process, but as currently constituted appears to be a substantial portion of the workload of referees, while simultaneously failing to reliably provide useful information. This is supported particularly well by the findings for evaluation questions 8, 11, 12, 24, and 25 (recommendations #2, #3, and #4 are directly related to this concern).

2. *Calibrate external reviewers.*

The survey of external reviewers indicated that most reviewers rely on past experience when reviewing applications, that the current guidelines are generally understandable, and that only a minority of external reviewers believe additional training would be helpful. In contrast, perceptions of members of the NRC and Secretariat indicate that some external reviews are too sparse to be usable and others provide content that disagree with the categorical grades (i.e., marks) assigned by reviewers. Poor reviews are not particularly common, but when they occur, they add to the workload of both the referee and the scientific collaborator, and they also often appear to make it more difficult to obtain the SNSF’s objective of a fair and transparent evaluation process.

Calibration of reviewers could eliminate these problems. Calibration could be

realized by providing reviewers with three one-page model reviews such as one excellent, one acceptable, and one poor external evaluation. Short commentary from the SNSF on each model review would indicate its positive and negative characteristics. This type of training of reviewers is not unprecedented and is likely to result in better overall quality of application evaluations, as reviewers will have concrete and immediate examples of what to do, what not to do, and what the difference is between the two.

3. *Distribute the work between the NRC and the Secretariat more effectively.*

Currently, the nomination of external reviewers is generally considered the exclusive responsibility of referees, and referees should certainly make the final decision about who should be asked to provide external reviews. However, it seems reasonable for scientific collaborators to provide referees with an initial list of possible reviewers. Sources for potential reviewers might include the list of authors cited in the application, a list generated by software tools like the currently available but underused “Reviewer Finder” from Elsevier, and a list generated from a database of past reviewers whose self-reported areas of expertise pertain to the subject of the application. The ‘positive list’ nominated by applicants is another possible source, although evidence exists that these reviewers are generally biased in favor of an application. All of these sources currently exist, but are inconsistently and infrequently used. The synthesis of these sources is an explicitly administrative task, requiring no expert judgment, and doing so for every application would provide a potentially large

savings in time and effort for referees.

4. *Provide for the direct rejection of applications for project funding in all divisions of the NRC.*

Interviewees indicate that Division III has a unique practice; applications submitted to the SNSF for Division III go through an administrative review by scientific collaborators at the Secretariat before they undergo external evaluation. If an application is manifestly inadequate, the applicant is invited to withdraw the application. This process helps reduce the number of applications that are reviewed by Division III, which became necessary due to the increasing number of applications submitted in recent years.

While it is clear from interviews that a two-tiered approach (analogous to the initial review of applications for SNSF Fellowships and Professorships) is likely inappropriate for project funding, this initial administrative review may be worthwhile. The major concern would be a lack of transparency, but this could easily be remedied by making the administrative criteria objective, explicit, and public. A direct rejection would be justified by a failure to meet one or more criteria and ratified by the appropriate member of the NRC, providing a clear basis for communication to the applicant about such a decision.

Expanding the early review currently practiced by Division III and implementing it systematically across divisions would result in fewer low-quality applications sent to external reviewers for evaluation. This would likely save an enormous amount of referees' time disproportionate to the number of applications rejected. It would likely also minimize the number of external reviewers needed in a given semester. Moreover, doing so is supported by interviewees within both the Secretariat and the NRC, many of whom indicated that low quality applications are the easiest to identify, discuss, and reject. One final

consideration is that external reviewers are less likely to agree to provide reviews for low quality applications than they would for applications of moderate or high quality. Critically, however, the criteria required for such a process should be carefully considered in order to avoid creating an obstacle that systematically disadvantages any particular group (e.g., young researchers).

5. *Provide compensation for external reviewers.*

Theories of social exchange (Dillman, Smyth, & Christian, 2009) generally suggest that incentives will contribute to the motivation of respondents and the quality of responses. Additionally, over 70% of respondents to the survey of external reviewers indicated that compensation would make them at least somewhat more likely to accept invitations to review on behalf of the SNSF. Internal SNSF documents and interviewees indicate that approximately 60% to 70% of requests for external reviews of funding applications are refused. If offering compensation motivated 70% of those to accept the SNSF's requests, the overall response rate would double from approximately 40% to approximately 80%. This step alone could provide substantial relief to referees.

Additionally, SNSF documents and interviewees both indicate that a perennial issue for the SNSF is the predominance of Swiss reviewers despite an institutional desire to avoid the fact or appearance of conflict of interest by seeking international peer review. Members of the NRC perceive Swiss reviewers as both more likely to agree to complete a review and more likely to provide a quality review. In situations where external reviews are difficult to obtain or are of low quality, Swiss reviewers are seen as the most direct solution. Providing a financial incentive for reviewers would likely increase reviewer response rates, and accordingly reduce the perceived necessity of using Swiss reviewers, further facilitating

the pursuit of a fair and unbiased evaluation procedure.

Due to internal political and financial considerations, caution and consideration are warranted, but introducing compensation has the possibility of reducing the principal obstacle to the SNSF external review process.

6. *Improve the documentation and guidelines for applicants, so that evaluation criteria, procedures, and decision-making processes are clearly delineated and transparent.*

While the documentation shared with applicants is clear to those internal to the SNSF, is not always clear and useful to the target audience. Potential applicants — particularly those new to the SNSF — should be able to quickly and easily locate information regarding the SNSF's funding instruments, evaluation processes, and other information online.

In addition to the current materials, a small set of quick-reference documents for applicants would help facilitate a fair and transparent review process, as well as assisting the SNSF in reaching junior researchers. These documents should be relatively short (ideally limited to one or two pages), should be written in clear and simple language, and should employ graphical elements (e.g., flowcharts, timelines) instead of text, where feasible.

Providing such a resource could be done at relatively low start-up cost, although such resources would require periodic review and revision.

7. *Conduct regular, systematic reviews and possible revisions to funding instruments.*

Some aspects of current funding instruments may be misaligned with their intentions. In particular, partitioning project funding into a group of long-term and continuing projects and a group of more typical short-term projects would help promote a fair and unbiased evaluation process.

Additionally, such a review procedure — in

particular, ongoing regular reviews conducted annually or semi-annually — would provide the SNSF with an opportunity to reconsider its involvement at each stage of the “pipeline” of scientific research. Reaching female researchers at an earlier stage in their academic careers, and encouraging the awareness and involvement of junior researchers more generally, would facilitate the overall objectives of the SNSF.

8. *Review and clarify selection procedures for NRC membership.*

No evidence casting any negative light on the qualifications or professional competence of any member of the NRC or its component panels and commissions was discovered during the evaluation. However, there is little clarity in publicly available documents about how a scientist becomes a member of the NRC or a component panel, and even members of the NRC were often unable to give an unambiguous description of the process for recruitment of new members.

Changes in recruitment, election, and selection procedures are not particularly recommended, but the current lack of transparency is not aligned with the objectives of the SNSF. It appears that recruitment is driven by informal or tacit policy within each division, and subject to the discretion of the presidium and other leadership of each division.

A working group or other meeting of the leadership in each division would be able to elicit and clarify descriptions of these procedures, and would likely be able to do so in the space of a few brief meetings.

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Appendices

Appendix A: Focal Evaluation Questions and Subquestions

Type	Number	Question
Focal	1	To what extent do the SNSF's evaluation procedures and their execution promote excellent research in all disciplines?
Focal	2	To what extent do the SNSF's evaluation procedures and their execution support research that is both scientifically relevant and original?
Focal	3	To what extent do the SNSF's evaluation procedures and their execution increase the competitiveness of Swiss research and researchers in Switzerland?
Focal	4	To what extent do the SNSF's evaluation procedures and their execution encourage the work of junior researchers?
Focal	5	To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation procedures are fair and unbiased?
Focal	6	To what extent do the SNSF's evaluation procedures and their execution ensure that evaluation decisions are transparent and comprehensible to applicants?
Structures and Environment		
Subquestion	7	Do the recruitment, election, and selection procedures result in the appointment of personnel to the National Research Council and its specialized sub-committees who are both qualified and independent?
Subquestion	8	Do the recruitment, election, and selection procedures for external reviewers and members of review panels result in the appointment of personnel who are both qualified and independent?
Subquestion	9	Do the recruitment, election, and selection procedures result in the appointment of personnel to the National Research Council-elected commissions who are both qualified and independent?
Subquestion	10	Do the recruitment, election, and selection procedures result in the appointment of personnel to the Research Commissions at institutions of higher education who are both qualified and independent?
Subquestion	11	What is the typical workload (in comparison to similar bodies at similar foundations) of members of the National Research Council and external reviewers?
Subquestion	12	Does the current workload of the National Research Council inhibit the SNSF goal of supporting excellent research and/or the goal of ensuring that evaluation procedures are fair and unbiased?
Subquestion	13	Do the structure, organization, and composition of the National Research Council, as a whole, and the component evaluation panels and commissions facilitate or inhibit the SNSF goals of supporting excellent research and ensuring evaluation procedures are fair and unbiased?
Subquestion	14	Does the division of tasks within and between the National Research Council and the Secretariat facilitate or inhibit the SNSF goals of supporting excellent research and ensuring evaluation procedures are fair and unbiased?
Subquestion	15	Does communication within and between the National Research Council and the Secretariat facilitate or inhibit the SNSF goals of supporting excellent research and ensuring evaluation procedures are fair and unbiased?

Type	Number	Question
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Targets, Criteria, Guidelines, and Processes

Subquestion	16	Do the evaluation criteria, processes, and related documents facilitate or inhibit the goals of the SNSF?
Subquestion	17	Are the evaluation criteria, processes, and related documents understandable to applicants, reviewers, and others involved in the evaluation of proposals?
Subquestion	18	Are the decisions that result from the evaluation process transparent and comprehensible to applicants?
Subquestion	19	Overall, are the SNSF criteria and evaluation processes biased toward or against funding particular research fields, methodologies, designs, or approaches?
Subquestion	20	Within SNSF funding schemes that employ a two-tiered evaluation procedure, does the two-tiered structure facilitate or inhibit identification of superior proposals?
Subquestion	21	Are there funding schemes that should employ a two-tiered evaluation procedure, but currently do not?
Subquestion	22	Does the comparatively high acceptance rate of follow-up applications facilitate or inhibit the goal of supporting excellent research?
Subquestion	23	Should there be separate evaluation criteria for follow-up and new applications?
Subquestion	24	Does the external review process provide enough information on the scientific merit of proposals for referees to make fair recommendations?
Transparency and Comprehensibility		
Subquestion	25	Are external reviewers, referees, co-referees, and others involved in the evaluation of proposals acting in a manner consistent with the goals and guidelines of the SNSF?
Subquestion	26	What implicit practices guide the evaluation process other than the goals and guidelines of the SNSF?
Subquestion	27	What are the intended and unintended effects of providing feedback to applicants who are not funded?
Subquestion	28	How could the communication of decisions be improved to better facilitate the SNSF goal of supporting excellent research?
Impacts		
Subquestion	29	Does the large number of funding schemes offered by the SNSF create artificial demand for funding, or do the schemes instead meet existing demands (i.e., as new funding schemes are created, do new people submit proposals, or do the same people submit proposals to new funding schemes)?
Subquestion	30	To what extent are funding decisions based on the past experience of the researcher, rather than the potential of the research as outlined in the application (i.e., does the SNSF prioritize funding experienced researchers rather than researchers with new ideas)?
Subquestion	31	Does the evaluation process result in systematically lower acceptance rates or funding levels for some groups of researchers (e.g., young researchers, female researchers, type of institution)?
Subquestion	32	Does the evaluation process result in systematic differences in acceptance rates or funding levels for some groups of researchers (e.g., young researchers, female researchers, type of institution) between the divisions of the National Research Council for project funding?

Appendix B: Question-Method Matrix

Type	Number	Documents	Interviews	Surveys	Extant Data
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Focal	1	✓	✓	✓	✓
Focal	2	✓	✓	✓	✓
Focal	3	✓	✓	✓	✓
Focal	4	✓	✓	✓	✓
Focal	5	✓	✓	✓	✓
Focal	6	✓	✓	✓	✓
Subquestion	7	✓	✓	✓	
Subquestion	8	✓	✓	✓	
Subquestion	9		✓	✓	
Subquestion	10	✓	✓	✓	
Subquestion	11	✓	✓	✓	
Subquestion	12	✓	✓		
Subquestion	13	✓	✓		
Subquestion	14		✓		
Subquestion	15	✓	✓	✓	
Subquestion	16		✓	✓	
Subquestion	17		✓	✓	
Subquestion	18	✓	✓	✓	
Subquestion	19	✓	✓	✓	
Subquestion	20	✓	✓	✓	
Subquestion	21		✓	✓	
Subquestion	22		✓		
Subquestion	23		✓		
Subquestion	24	✓	✓		
Subquestion	25	✓	✓	✓	
Subquestion	26		✓	✓	
Subquestion	27		✓		
Subquestion	28		✓		
Subquestion	29		✓		✓
Subquestion	30		✓	✓	
Subquestion	31		✓		
Subquestion	32		✓		✓

Appendix C: Documents Included in Document Analysis

Ambizione and Ambizione-PROSPER/SCORE Factsheet

Annual Report 2010

Description of the Evaluation Procedure for the year 2011 (for Project Funding only)

Division Careers: Forms, Regulations, and Guidelines

Evaluation of grant applications

Evaluation Sheet (request for prolongation): SNF Professorships

Evaluation Sheet (stage 1): SNF Professorships

Evaluation Sheet (stage 2): SNF Professorships

Evaluation Sheet Follow-up Proposal: Ambizione

Evaluation Sheet Phase 1: Ambizione

Evaluation Sheet Phase 2: Ambizione

Form for ranking of projects: Project funding

Funding Regulations: Project funding

Gender and Research Funding: Final Report and Synthesis

Gender and Research Funding: Summary of the Synthesis Report

General implementation regulations for the Funding Regulations

Guidelines for applicants (for Project Funding only)

Guidelines for selecting SNSF funding schemes

Guidelines for the assessment by external reviewers and Form (instrument) for Referee's Recommendation - Project Funding

Guidelines for the assessment of applications by members of the Research Council

Guidelines for the assessment of project funding applications by external reviewers

Half-yearly statistics of project funding: Summer semester 2011

Interview: Synopsis (Ambizione)

Interview: Synopsis (SNF Professorships)

Introductory Presentation about SNSF

Mission Statement of the SNSF

Multi-Year Programme 2012-2016

Organisational Regulations of the National Research Council of 14 November 2007

Reader System: Documentation provided to external reviewers by Division 1

Report: Reader System (RS) experience in the Divisions I/III

Review form (non-use-inspired research)

Review form (use-inspired research)

Sample e-mail for first contact with external reviewers (non-use-inspired research)

Sample e-mail for first contact with external reviewers (use-inspired research)

Sample e-mail with information concerning evaluation procedure for reviewers who agreed to provide a review (use-inspired research)

Sample e-mail with information concerning evaluation procedure for reviewers who agreed to provide a review (non-use-inspired research)

Scientific evaluation

SNSF Mission Statement on Equality between Women and Men

SNSF Profile

SNSF Statutes

Ten Years of Equal Opportunities in Research Funding

The Swiss National Science Foundation: Achievements, Performance, Perspectives. External Evaluation Report 2001

Third Monitoring Report on Peer Review

Appendix D: Foundation Council Survey

Question	Stem	Response Options
1	Briefly describe your role in the Foundation Council, including tasks and activities with which you are involved:	Open-ended
2	Given that the Foundation Council inherently is the political body of the SNSF, please indicate how you balance the following influences when making SNSF policy decisions, by allocating approximate percentages across the categories below. The allocated values should add to 100%.	
	a International funding climate	Any number
	b Federal government	Any number
	c Cantonal government	Any number
	d Academic institutions	Any number
	e Research communities	Any number
	f Private sector	Any number
	g Public opinion	Any number
	h SNSF National Research Council	Any number
	i SNSF Secretariat	Any number
	j Other	Any number
3	If you selected "other" for question #2 above, please briefly describe the other influences:	Open-ended
4	Please indicate how you balance the following influences when making SNSF strategic plan decisions by allocating approximate percentages across the categories below. The allocated values should add to 100%.	
	a International funding climate	Any number
	b Federal government	Any number
	c Cantonal government	Any number
	d Academic institutions	Any number
	e Research communities	Any number
	f Private sector	Any number
	g Public opinion	Any number
	h SNSF National Research Council	Any number
	i SNSF Secretariat	Any number
	j Other	Any number
5	If you selected "other" for question #4 above, please briefly describe the other influences:	Open-ended
6	Please indicate how you balance the following influences when making funding allocation decisions by allocating approximate percentages across the categories below. The allocated values should add to 100%.	
	a Political influences (NCCR/NRPs)	
	b Strategic plan (four year plan)	Any number
	c SNSF values (female researchers, young researchers)	Any number
	d Economic conditions	Any number
	e Other	Any number

7	If you selected "other" for question #6 above, please briefly describe the other influences:	Open-ended
8	In your point of view, what factors hinder the overall quality and transparency of evaluation at the SNSF?	Open-ended
9	In your point of view, what factors contribute to the overall quality and transparency of evaluation at the SNSF?	Open-ended
10	How do you expect SNSF to use the conclusions and recommendations that result from this evaluation of the overall quality and transparency of evaluation at the SNSF?	Open-ended

Appendix E: Applicant Survey

Question	Stem	Response Options				
1	Based on your most recent application, are the following easily understood as described in SNSF application documents?	Yes	No			
	a How to select a funding instrument.	86.92%	13.08%			
	b How to prepare an application.	92.44%	7.56%			
	c How to submit an application.	97.48%	2.52%			
	d The evaluation criteria.	59.07%	40.93%			
	e How the evaluation procedure works.	56.60%	43.40%			
	f How funding decisions are made.	44.92%	55.08%			
	g How to communicate with the SNSF.	91.14%	8.86%			
2	Please explain your responses to question #1.	Open-ended				
3	Based on your most recent application, which one of the following is the most difficult to understand as described in SNSF application documents?	How to select a funding instrument	How to prepare an application	How to submit an application	The evaluation criteria	How the evaluation procedure works
		9.25%	3.08%	2.20%	19.82%	15.42%
			How funding decisions are made.	How to communicate with the SNSF.		
			46.70%	3.52%		
4	Based on your most recent application, how useful are the following as described in SNSF application documents?	Not at all useful	Somewhat useful	Useful	Very useful	
	a How to select a funding instrument.	0.86%	17.67%	56.47%	25.00%	
	b How to prepare an application.	0.43%	8.26%	49.13%	42.17%	
	c How to submit an application.	0.43%	2.60%	46.32%	50.65%	
	d The evaluation criteria.	14.22%	36.00%	38.22%	11.56%	
	e How the evaluation procedure works.	19.56%	36.44%	35.11%	8.89%	

f	How funding decisions are made.	32.74%	34.07%	25.66%	7.52%
g	How to communicate with the SNSF.	2.18%	9.61%	51.53%	36.68%
5	Please explain your responses to question #4.	Open-ended			
6	Based on your most recent application, do the following statements describe the feedback that you received from the SNSF?	Yes	No		
a	The feedback was sufficiently detailed.	56.56%	43.44%		
b	The feedback was useful.	67.12%	32.88%		
c	The feedback was constructive.	60.56%	39.44%		
d	The feedback was easily understood.	79.36%	20.64%		
e	The feedback was impartial.	66.01%	33.99%		
7	Please explain your responses to question #6.	Open-ended			
8	How did/will you use the feedback you received from your most recent SNSF application?	Open-ended			
9	Based on your most recent application, how would you rate the clarity of the following, in general, at the SNSF?	Very unclear	Unclear	Clear	Very clear
a	How to select a funding instrument.	1.85%	8.80%	52.31%	37.04%
b	How to prepare an application.	0.92%	5.53%	51.15%	42.40%
c	How to submit an application.	0.93%	0.47%	44.19%	54.42%
d	The evaluation criteria.	8.37%	36.28%	44.65%	10.70%
e	How the evaluation procedure works.	10.80%	38.97%	39.91%	10.33%
f	How funding decisions are made.	22.07%	43.66%	26.29%	7.98%
g	How to communicate with the SNSF.	2.76%	7.37%	43.32%	46.54%
10	Please explain your responses to question #9.	Open-ended			
11	Based on your most recent application, how would you rate the overall quality of application evaluation, in general, by the SNSF?	Very low quality	Low quality	High quality	Very high quality
		2.33%	18.14%	65.58%	13.95%

12	Please explain your response to question #11.	Open-ended			
13	To what extent do you agree or disagree that the SNSF evaluation criterion of scientific track record applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
a	Supporting excellent research in all disciplines.	1.52%	11.17%	59.39%	27.92%
b	Supporting scientifically relevant research.	2.02%	16.16%	55.56%	26.26%
c	Supporting scientifically original research.	3.06%	27.04%	44.90%	25.00%
d	Increasing the international competitiveness of Swiss research.	1.01%	9.60%	55.56%	33.84%
e	Increasing the international competitiveness of researchers in Switzerland.	1.52%	14.65%	51.52%	32.32%
f	Supporting junior/young researchers.	11.52%	34.03%	32.46%	21.99%
g	Supporting female researchers.	7.73%	29.28%	47.51%	15.47%
14	To what extent do you agree or disagree that the SNSF evaluation criterion of expertise applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
a	Supporting excellent research in all disciplines.	0.52%	10.99%	60.73%	27.75%
b	Supporting scientifically relevant research.	1.04%	12.50%	63.02%	23.44%
c	Supporting scientifically original research.	2.59%	19.69%	52.85%	24.87%
d	Increasing the international competitiveness of Swiss research.	1.04%	12.95%	58.03%	27.98%
e	Increasing the international competitiveness of researchers in Switzerland.	1.04%	13.47%	59.07%	26.42%
f	Supporting junior/young researchers.	2.15%	30.65%	43.55%	23.66%
g	Supporting female researchers.	2.82%	22.60%	53.67%	20.90%
15	To what extent do you agree or disagree that the SNSF evaluation criterion of scientific relevance applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
a	Supporting excellent research in all disciplines.	2.12%	17.46%	53.44%	26.98%
b	Supporting scientifically relevant research.	0.53%	10.00%	46.84%	42.63%
c	Supporting scientifically original research.	3.70%	22.22%	47.62%	26.46%
d	Increasing the international competitiveness of Swiss research.	0.00%	12.77%	60.11%	27.13%
e	Increasing the international competitiveness of researchers in Switzerland.	0.00%	14.89%	57.45%	27.66%

	f	Supporting junior/young researchers.	1.64%	18.58%	58.47%	21.31%
	g	Supporting female researchers.	2.89%	18.50%	59.54%	19.08%
16		To what extent do you agree or disagree that the SNSF evaluation criterion of originality applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
	a	Supporting excellent research in all disciplines.	1.58%	13.16%	51.05%	34.21%
	b	Supporting scientifically relevant research.	1.58%	16.32%	54.21%	27.89%
	c	Supporting scientifically original research.	1.06%	8.99%	39.15%	50.79%
	d	Increasing the international competitiveness of Swiss research.	1.58%	10.53%	52.63%	35.26%
	e	Increasing the international competitiveness of researchers in Switzerland.	1.06%	13.76%	50.26%	34.92%
	f	Supporting junior/young researchers.	2.70%	13.51%	53.51%	30.27%
	g	Supporting female researchers.	2.29%	17.71%	57.14%	22.86%
17		To what extent do you agree or disagree that the SNSF evaluation criterion of topicality applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
	a	Supporting excellent research in all disciplines.	3.91%	28.49%	55.31%	12.29%
	b	Supporting scientifically relevant research.	2.22%	22.22%	61.11%	14.44%
	c	Supporting scientifically original research.	4.49%	30.34%	51.12%	14.04%
	d	Increasing the international competitiveness of Swiss research.	2.79%	18.44%	63.69%	15.08%
	e	Increasing the international competitiveness of researchers in Switzerland.	2.76%	20.44%	59.67%	17.13%
	f	Supporting junior/young researchers.	5.78%	26.59%	54.91%	12.72%
	g	Supporting female researchers.	6.02%	28.92%	54.22%	10.84%
18		To what extent do you agree or disagree that the SNSF evaluation criterion of broader impact applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
	a	Supporting excellent research in all disciplines.	4.92%	27.87%	53.01%	20.77%
	b	Supporting scientifically relevant research.	2.19%	24.04%	53.01%	20.77%
	c	Supporting scientifically original research.	5.49%	34.62%	44.51%	15.38%

	d	Increasing the international competitiveness of Swiss research.	2.16%	20.00%	57.84%	20.00%
	e	Increasing the international competitiveness of researchers in Switzerland.	2.16%	24.86%	52.43%	20.54%
	f	Supporting junior/young researchers.	4.47%	34.08%	49.16%	12.29%
	g	Supporting female researchers.	4.68%	35.67%	48.54%	11.11%
19		To what extent do you agree or disagree that the SNSF evaluation criterion of suitability of methods applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
	a	Supporting excellent research in all disciplines.	1.63%	9.24%	53.80%	35.33%
	b	Supporting scientifically relevant research.	2.15%	11.29%	57.53%	29.03%
	c	Supporting scientifically original research.	4.32%	17.30%	52.43%	25.95%
	d	Increasing the international competitiveness of Swiss research.	1.08%	11.89%	56.76%	30.27%
	e	Increasing the international competitiveness of researchers in Switzerland.	1.08%	12.37%	58.06%	28.49%
	f	Supporting junior/young researchers.	3.33%	15.00%	58.33%	28.33%
	g	Supporting female researchers.	2.89%	19.08%	54.91%	23.12%
20		To what extent do you agree or disagree that the SNSF evaluation criterion of feasibility applied to applications submitted for funding work towards meeting the following SNSF objectives?	Strongly disagree	Disagree	Agree	Strongly agree
	a	Supporting excellent research in all disciplines.	2.16%	13.51%	60.54%	23.78%
	b	Supporting scientifically relevant research.	1.62%	15.68%	57.84%	24.86%
	c	Supporting scientifically original research.	5.38%	22.58%	52.69%	19.35%
	d	Increasing the international competitiveness of Swiss research.	0.54%	14.05%	63.78%	21.62%
	e	Increasing the international competitiveness of researchers in Switzerland.	0.54%	16.30%	62.50%	20.65%
	f	Supporting junior/young researchers.	2.79%	21.79%	56.42%	18.99%
	g	Supporting female researchers.	4.12%	21.76%	57.06%	17.06%
21		Are there any criteria for evaluating applications that should be applied, but are not (please explain)?	Open-ended			
22		Based on your most recent application, are the following types of applications more favored (i.e., more likely to receive funding) than others by the SNSF evaluation procedure?	Yes	No		

a	Applications from particular groups of applicants.	61.58%	38.42%		
b	Applications using particular research approaches.	48.62%	51.38%		
c	Applications in particular disciplinary areas.	53.63%	46.37%		
d	Applications for applied/use-oriented research.	27.33%	72.67%		
e	Applications for high-risk, high-reward research.	21.05%	78.95%		
23	Please explain your responses to question #22.	Open-ended			
24	When the SNSF announces new funding instruments in your disciplinary area, how do you consider whether to submit an application to these opportunities to support your research?	Open-ended			
25	When the SNSF announces new funding instruments in your disciplinary area, what is the likelihood that you would submit an application to these opportunities to support your research?	Very unlikely	Unlikely	Likely	Very likely
		6.80%	15.53%	56.31%	21.36%
26	Have you ever served or are you serving in any of the following capacities for the SNSF?	Current	Past	Never	
a	SNSF Foundation Council	0.51%	0.51%	98.98%	
b	SNSF National Research Council	3.05%	2.54%	94.42%	
c	SNSF Secretariat	0.52%	0.52%	98.96%	
d	SNSF External Reviewer	16.59%	27.49	55.92%	

Appendix F: External Reviewer Survey

Question	Stem	Response Options		
1	How many years have you served in the following roles (if none, please enter "0")?	Mean (95% confidence interval)		
a	A peer reviewer for scholarly journals:	17.59 (16.27, 18.90)		
b	A reviewer of applications to grant-making organizations for funding (excluding the SNSF):	12.19 (11.01, 13.37)		
c	A reviewer of applications to the SNSF for funding:	4.59 (3.96, 5.22)		
2	How many times has the SNSF asked you to complete an application review?	3.35 (1.64, 5.06)		
3	In the past year, how many reviews have you performed for the following (if none, please enter "0")?			
a	Peer-reviewed journals:	28.26 (15.89, 40.63)		
b	Grant-making organizations for funding (excluding the SNSF):	6.75 (4.93, 8.57)		
c	The SNSF for funding:	0.89 (0.66, 1.11)		
4	Do you typically receive financial compensation when providing reviews for the following?	Yes	No	Not applicable
a	Peer-reviewed journals:	0.92%	96.29%	2.77%
b	Grant-making organizations for funding (excluding the SNSF):	25.00%	68.98%	6.01%
5	Reviewers are often selected for their specialized expertise. Please indicate the primary, secondary, and tertiary discipline(s) in which you are an expert.			
a	Primary discipline:	Open-ended		

	b	Secondary discipline:	Open-ended				
	c	Tertiary discipline:	Open-ended				
6		Based on your most recent review request, how persuasive was the e-mail solicitation sent by the SNSF?	Not at all persuasive	Somewhat persuasive	Persuasive	Very persuasive	
	a	Persuasiveness of e-mail solicitation:	11.50%	28.00%	53.00%	7.50%	
	b	Please explain your answer.	Open-ended				
7		Would a solicitation using the following methods, rather than making contact by impersonal form e-mail, make you more or less likely to complete a review for SNSF?	Much less likely	Somewhat less likely	About the same	Somewhat more likely	Much more likely
	a	Telephone call:	33.33%	15.15%	29.29%	11.61%	10.60%
	b	Postal letter:	23.00%	11.50%	46.00%	13.50%	6.00%
	c	Personalized e-mail:	2.94%	0.49%	38.23%	34.80%	23.52%
	d	Public request for reviewers:	56.54%	23.56%	18.84%	0.52%	0.52%
	e	Other:	65.21%	4.34%	23.91%	2.17%	4.34%
	f	If other, please explain your answer:	Open-ended				
8		Did the following factors motivate you to complete your most recent application review for the SNSF?	Yes	No			
	a	To support my field of research:	87.31%	12.68%			
	b	To support the SNSF:	63.63%	36.36%			
	c	To support research in Switzerland:	61.34%	38.65%			
	d	To remain current with new developments in European research:	71.71%	28.28%			
	e	To learn more about preparing funding applications for SNSF:	19.17%	80.82%			
	f	So that my name will be familiar to the SNSF when I apply for funding:	10.36%	89.63%			
	g	Other:	25.00%	75.00%			

	h	Other (please specify)	Open-ended			
9		What do you personally gain by providing an application review for the SNSF?	Open-ended			
10		If the SNSF offered monetary compensation, would it make you any more likely to provide reviews in the future?	No more likely	Somewhat more likely	Much more likely	
			28.64%	44.66%	26.69%	
11		On average, do reviews of SNSF applications require more or less time to complete than reviews for non-SNSF funders?	More	About the same	Less	
	a	Average time:	3.94%	92.11%	3.94%	
	b	If SNSF reviews require "more" or "less" time, please explain the time difference and underlying reasons:	Open-ended			
12		When completing reviews of SNSF applications, to what extent does the review process compete with your other responsibilities?	Not at all	Very little	Somewhat	A lot
			2.94%	6.37%	60.78%	29.92%
13		How reasonable is the time frame (i.e., deadline) for completing a SNSF application review?	Very unreasonable	Somewhat unreasonable	Somewhat reasonable	Very reasonable
			1.45%	6.79%	65.53%	26.21%
14		How much does your prior review experience influence how you complete your review(s) of SNSF applications?	No influence	Very little influence	Some influence	A lot of influence
			3.39%	12.13%	46.11%	38.34%
15		Based on your most recent review, how adequate is the information provided in the application for completing a review?	Inadequate	Somewhat inadequate	Somewhat adequate	Adequate

		0.49%	3.43%	23.03%	73.03%
16	Do the following factors influence how you conduct your review of applications for the SNSF?	Yes	No		
	a Potential for being identified as a reviewer by the applicant:	19.11%	80.88%		
	b Potential for offending the applicant:	20.29%	79.70%		
	c Other:	25.58%	74.41%		
	d Other (please specify)	Open-ended			
17	Did you read the review guidelines provided by the SNSF prior to conducting your most recent review?	Yes	No		
	a Read guidelines:	91.50%	8.50%		
	b If "no", why not?	Open-ended			
18	How adequate are SNSF guidelines for completing a review of an application as related to the following?	Inadequate	Somewhat inadequate	Somewhat adequate	Adequate
	a Understanding individual review criteria:	0.53%	1.06%	27.27%	71.12%
	b Applying individual review criteria:	0.53%	1.60%	31.01%	66.84%
	c Understanding the standards (i.e., "grades") applied to review criteria:	1.61%	2.15%	31.72%	64.51%
	d Applying the standards (i.e., "grades") to review criteria:	1.63%	1.63%	33.69%	63.04%
	e Constructing the review narrative:	0.54%	1.62%	36.75 %	61.08%
	f Preparing an "overall" assessment of an application:	1.09%	2.19%	31.86%	64.83%
19	If you answered "inadequate" or "somewhat inadequate" above, please explain:	Open-ended			
20	When conducting application reviews, what aspects of the SNSF review guidelines are (a) most useful, (b) least				

	useful, and (c) missing?		
a	Most useful:	Open-ended	
b	Least useful:	Open-ended	
c	Missing:	Open-ended	
21	Do external reviewers of SNSF applications need training?	Yes	No
a	Training needed	13.56%	86.43%
b	Please explain your answer:	Open-ended	
22	Did you receive any formal training before providing a review for "other" grant-making organization(s)?	Yes	No
a	Received training from other funding organizations:	8.41%	91.58%
b	If "yes," please describe:	Open-ended	
23	Which one of the following modes of reviewer training would you most prefer, if offered by the SNSF?	Preference	
a	Self-paced training via written guidelines	33.72%	
b	Self-paced training through an online tutorial	25.00%	
c	Webinar training	6.97%	
d	Interactive online training	9.88%	
e	Face-to-face training	5.81%	
f	Blended training	2.90%	
g	Other	15.69%	
h	Other (please specify):	Open-ended	
24	Have you ever received research funding as the primary awardee from the SNSF?	Yes	No
		19.80%	80.19%
25	Have you ever received research funding	Yes	No

	as the primary awardee from a grant-making organization other than the SNSF?			
	a Other grant-making funding	81.28%	18.71%	
	b Other (please specify):	Open-ended		
26	Have you ever served or are you serving in any of the following capacities for the SNSF?	Current	Past	Never
	a SNSF Foundation Council:	0.51%	0.51%	98.97%
	b SNSF National Research Council:	1.52%	2.03%	96.44%
	c SNSF Secretariat:	0.00%	0.00%	100.00%
	d Other:	4.22%	1.40%	94.36%
	e Other (please specify):	Open-ended		
27	Please provide any additional details that you think are important:	Open-ended		

Appendix G: Extant Data Processing

00_SvGB Oct 2005-March2012 selected files.xlsx was an Excel workbook provided to WMU through the mySNF platform. This workbook was a variable-record number file corresponding to SNSF applications (funded and unfunded). The primary identifier in the workbook was SNFS_ID, which represents an application (not an applicant). In the workbook there are multiple records per SNSF_ID (application) due to multiple funding years for any given application (there can be multiple disbursements within one year, referred to as a SNSF set). In addition, there can be multiple SNS_IDs per principal applicant (multiple application submissions).

Described below are the data processing steps that created the applicant dataset for sampling and all application-based analyses.

1. Delete the records that should not be in the file
 - a. 37,033 rows read in from “00_SvGB Oct 2005-March2012 selected files.xlsx”
 - b. 2,181 rows deleted (REDFLAG) & 3,852 rows deleted with RULINGDATE="" (missing)
 - c. 32,318 rows written to ApplicantsV1.sas7bdat
2. Identification of multiple records per case (case is the application, not the applicant)

ID_freq	Frequency	Cumulative		
		Percent	Frequency	Percent
1	24947	88.80	24947	88.80
2	2403	8.55	27350	97.36
3	524	1.87	27874	99.22
4	143	0.51	28017	99.73
5	47	0.17	28064	99.90
6	19	0.07	28083	99.97
7	4	0.01	28087	99.98
8	3	0.01	28090	99.99
9	1	0.00	28091	100.00
11	1	0.00	28092	100.00

- a. Append variable ID_freq (this is a count of the records by SNSF_ID)
- b. Append variable REC_CNT (this is a record counter index variable (1,2, ... ID_freq))
- c. 32,318 rows written to ApplicantsV2.sas7bdat
3. Find year of first award year by searching array (per record processing) AMTGranted2004-AMTGranted2017
 - a. Saves variable in FirstYR
 - b. 32,318 rows written to ApplicantsV3.sas7bdat
4. Calculation of CUMTOTAL (total awards summed over all years within a record) and accumulated over all records (when there are multiple records per application) by SNFS_ID. The CUMTOTAL on the last record in a SNSF_ID set will have total accumulated amount of disbursement for the

application.

- a. 32,318 rows written to ApplicantsV4.sas7bdat
- b. Rolling up the CUMTOTAL – moving the CUMTOTAL to the first record in an SNSF_ID set (32,318 rows written to ApplicantsV4b.sas7bdat)
5. Construct a new record counter, generate a new random ID from a uniform distribution and create a new variable FUNDED
 - a. (if CUMTOTAL>0 FUNDED=1) (else FUNDED=-1)
 - b. 32,318 rows written to ApplicantsV5.sas7bdat
6. Trim all cases (applications) that had a start date before 2006 (where the initial funding began before 2006)
 - a. 1353 Cases rejected
 - b. 30,965 rows written to ApplicantsV6.sas7bdat
7. Selected from ApplicantV6.sas7bdat the first record of a case and where APPLICANTGENDER > "" (this is an application unique dataset, it is not an applicant unique data set) (26,860 record/cases written to UniqueCases.sas7bdat)
8. Processing applicant variables within the applications dataset
 - a. AGE, GENDER, DIVISION, INSTITUTION, YR, PREVIOUSFUND
 - b. AGE: Based on DOB, filters (25<= AGE <90) retains in the data (n=250 possibly dropped)
 - c. GENDER: Male=1, Female=0
 - d. DIVISION: ADMINDIVISION was used to create a new variable DIVISION with 5 levels (division 1, 2, 3, all codes with the string "CAR" and everything else, I then over parameterized 5 dummy variables so that any subset could be examined depending on what 'extra' dummy code was omitted.

Division 1:	D1=1	D2=0	D3=0	D4=0	D5=0
Division 2:	D1=0	D2=1	D3=0	D4=0	D5=0
Division 3:	D1=0	D2=0	D3=1	D4=0	D5=0
Careers:	D1=0	D2=0	D3=0	D4=1	D5=0
Other:	D1=0	D2=0	D3=0	D4=0	D5=1
- e. YR: filters to only 2005-2012 (possibly dropping n=237)
- f. PREVIOUSFUND: proxy for previous SNSF funding success (ANTERIORPROJECTID>.)
- g. INSTITUTION: used variable INSTITUTIONTYPE
- h. Moved (INSTITUTIONTYPE ="Andere" and INSTITUTIONATRULING="Pädagogische Hochschule") {n=29} to INSTITUTIONTYPE ="Fachhochschule"
- i. Set up dummy code with referent as "Kantonale Universitat"

The over parameterization works by omitting one of the dummy codes in the model. For example, if the model is to compare D1, D2 & D3, inclusion of D1 & D2 in the model statement + a subsetting WHERE statement (if Division<4) will set the referent group to D3 in the analysis. If D1 were to be the referent group then D2 & D3 would be listed as dummy predictors with the same subsetting WHERE statement.

Kantonale:	INST1=0	INST2=0	INST3=0
ETH:	INST1=1	INST2=0	INST3=0
Fach	INST1=0	INST2=1	INST3=0
Andere	INST1=0	INST2=0	INST3=1

26,418 record/cases written to UniqueApplicantsV7.sas7bdat

Appendix H: Funding Instruments Included in Primary Logistic Regression Analysis

Normal

Abt. übergreifend mit Abteilung 1

Abt. übergreifend mit Abteilung 2

Abt. übergreifend mit Abteilung 3

DORE: Projekte

Langzeitprojekte

Kohortenstudien/Nested projects

Interdisziplinär Abt. I/II (Lead Abt. I)

Interdisziplinär Abt. I/III (Lead Abt. I)

Interdisziplinär Abt. II/I (Lead Abt. II)

Interdisziplinär Abt. II/III (Lead Abt. II)

Interdisziplinär Abt. III/I (Lead Abt. III)

Interdisziplinär Abt. III/II (Lead Abt. III)

Interdisziplinär alle Abteilungen (Lead Abt. I)

Interdisziplinär innerhalb Abt. I

Interdisziplinär innerhalb Abt. II

Interdisziplinär innerhalb Abt. III

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