MEASURING CONNECTION TO NATURE

—A ILLUSTRATED EXTENSION OF THE INCLUSION OF NATURE IN SELF SCALE (STUDY 2 & STUDY 3)

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発表日：2024.08.14

STUDY 2

目的

- Tested on university students and compared with the original INS and the connectedness to nature scale (CNS).
  - 大学生中新たな図的INS（ IINS ）をテストする＆元INS、CNSを比較する

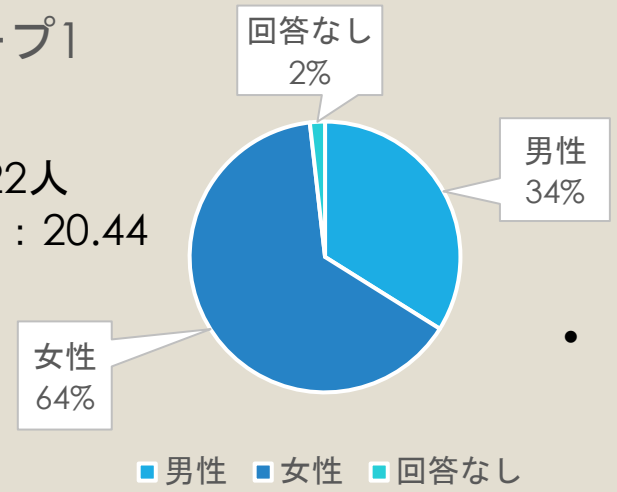
研究方法

- グループ1（with the IINS）：
- In the first year (winter semester 2018/19), 322 students (64.3% female, 33.9% male, 1.8% no answer; Mage = 20.44) were surveyed.

- グループ2（with the INS）：
- In the following year (winter semester 19/20), 266 new students (62.0% female, 35.3 male, 2.6 no answer; Mage = 20.51) were questioned.

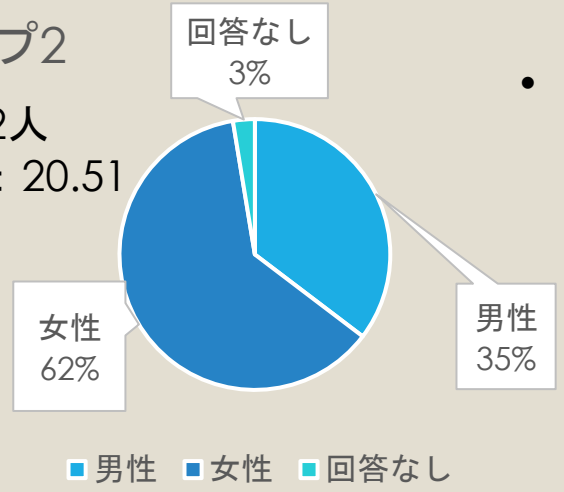
グループ1

総計：322人
平均年齢：20.44

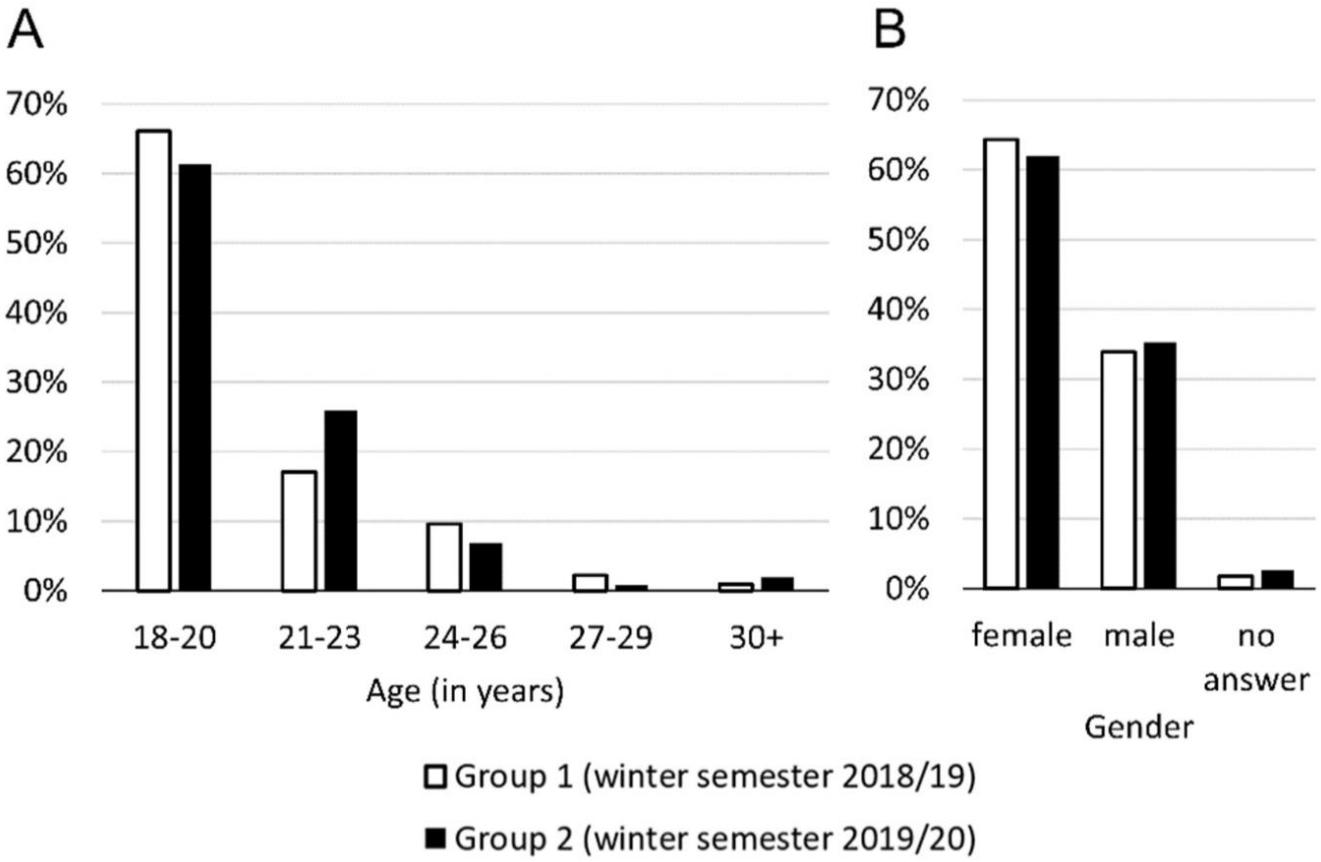


グループ2

総計：322人
平均年齢：20.51



- students were surveyed in two consecutive years in the course “Structure and Function of Organisms” at GoetheUniversity Frankfurt.
- 参加者全員はゲーテ大学で2年間連続して「生物の構造と機能」コースを受講した学生



比較

- The largest age cohort was the 18 to 20 year-olds in both groups.
- 最大の年齢層は18歳から20歳
- In terms of gender distribution, the proportion of women was larger in both groups.
- 両グループとも女性の割合が高かった
- The survey was voluntary and all respondents were of legal age at the time of the study.
- 参加者は全員自発で、法定年齢に達していた
- The students were asked to fill in the questionnaire at the beginning of the practical work phase of the course and leave it on the table at the end of the day.
- 学生はコースが始まる時にアンケートに記入し、一日の終わりにそれを机の上に残すように求められた。

研究方法(CNS)

- CNSとは？
  - Die Connectedness to Nature Scale is a question instrument consisting of 14 items from Mayer and Frantz [5] which aims to measure the affective connection to nature.
  - Connectedness to Nature Scale（自然とのつながり尺度、CNS）は、MayerとFrantzによって作成された14項目を持つアンケートで、自然への感情的なつながりを測定することである【5】。

研究方法(CNS)

- 信頼性？
  - It has been used in numerous studies [16, 17 ,40 ,42] and its reliability confirmed repeatedly, also for different languages [43 –46].
  - 多数の研究で使用され、その信頼性が確認されており、異なる言語でも信頼性が確認されている【16, 17, 40, 42-46】。
  - Even though the instrument has been criticized by some authors for not measuring the emotional connection to nature as it is supposed to [47], its correlation and therefore convergent validity to other measuring instruments of the concept of connection to nature could be proven [48– 50].
  - 一部の著者からは、感情的な自然とのつながりを測定していないと批判されていますが【47】、他の自然とのつながりを測定するツールとの相関性や妥当性が証明されている【48-50】。

研究方法(CNS)

- Since the study was conducted during class time, a shortened version of the CNS was used in order to keep the questionnaire as short and compact as possible. For this purpose, five items with high factor loading from the original study of Mayer and Frantz [5] were selected. The applicability of a shortened CNS was confirmed several times in previous research [45,46,51].
- この研究は授業中に実施されたため、アンケートをできるだけ短くコンパクトに保つためにCNSの省略版が使用された。このために、MayerとFrantzの研究14項目から因子負荷の高い5項目が選ばれた。省略版CNSの適用性は、過去の研究で何度も確認されていた【45, 46, 51】。

研究方法（CNS）

Appendix A

Please answer each of these questions in terms of *the way you generally feel*. There are no right or wrong answers. Using the following scale, in the space provided next to each question simply state as honestly and candidly as you can what you are presently experiencing.

1	2	3	4	5
Strongly disagree		Neutral		Strongly agree

____1. I often feel a sense of oneness with the natural world around me.
____2. I think of the natural world as a community to which I belong.
____3. I recognize and appreciate the intelligence of other living organisms.
____4. I often feel disconnected from nature.
____5. When I think of my life, I imagine myself to be part of a larger cyclical process of living.
____6. I often feel a kinship with animals and plants.
____7. I feel as though I belong to the Earth as equally as it belongs to me.
____8. I have a deep understanding of how my actions affect the natural world.
____9. I often feel part of the web of life.
____10. I feel that all inhabitants of Earth, human, and nonhuman, share a common 'life force'.
____11. Like a tree can be part of a forest, I feel embedded within the broader natural world.
____12. When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature.
____13. I often feel like I am only a small part of the natural world around me, and that I am no more important than the grass on the ground or the birds in the trees.
____14. My personal welfare is independent of the welfare of the natural world.

1. 私はしばしば、自分が自然の一部と感じる。
2. 他人との関係を考えるとき、自然との関係も考える。
3. 私は生物の知性と強さを認識し、感謝している。

Appendix A

Please answer each of these questions in terms of *the way you generally feel*. There are no right or wrong answers. Using the following scale, in the space provided next to each question simply state as honestly and candidly as you can what you are presently experiencing.

1	2	3	4	5
Strongly disagree		Neutral		Strongly agree

____1. I often feel a sense of oneness with the natural world around me.
____2. I think of the natural world as a community to which I belong.
____3. I recognize and appreciate the intelligence of other living organisms.
____4. I often feel disconnected from nature.
____5. When I think of my life, I imagine myself to be part of a larger cyclical process of living.
____6. I often feel a kinship with animals and plants.
____7. I feel as though I belong to the Earth as equally as it belongs to me.
____8. I have a deep understanding of how my actions affect the natural world.
____9. I often feel part of the web of life.
____10. I feel that all inhabitants of Earth, human, and nonhuman, share a common 'life force'.
____11. Like a tree can be part of a forest, I feel embedded within the broader natural world.
____12. When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature.
____13. I often feel like I am only a small part of the natural world around me, and that I am no more important than the grass on the ground or the birds in the trees.
____14. My personal welfare is independent of the welfare of the natural world.

4. 私は自然環境と切り離されないとよく感じている。
5. 自分の人生を考えると、私はより大きい循環システムに所属していること想像する。
6. 私は動物と植物の親近感を感じる。

7. 私は地球に所属することと同じくらい、地球も自分に所属していると感じる。
8. 自分の行動は自然にどのような影響を与えているかについて深く理解している。
9. 私は自然界の循環の一部と感じる
10. 地球上の全ての住民（人間と非人間）が共通の「生命力」を共有していると感じる。
11. 木が森の一部であるように、私は自然の一部に組み込まれていると感じる。
12. 地球上、自分の位置を考える時に、自分が自然界のトップと考えている。
13. 私は自然の中で小さいの一部であり、地面の草や木の鳥より重要デアはないと感じる。
14. 個人的な福祉は自然との関係がないと考える。

研究方法(CNS)

Table 1. Result of the principal component analysis (PCA) with the items of the reduced Connectedness to Nature Scale (CNS).

		Factor 1
CNS_1	I often feel part of the web of life.	0.855
CNS_2	I often feel a sense of oneness with natural world around me.	0.807
CNS_3	I think of the natural world as a community to which I belong.	0.783
CNS_4	I feel as though I belong to the Earth as equally as it belongs to me.	0.692
CNS_5	When I think of my life, I imagine myself to be part of a larger cyclical process of living.	0.685

$\alpha = 0.816$.

- 私は自然界の循環の一部と感じる（９）
- 私はしばしば、自分が自然の一部と感じる（１）
- 他人との関係を考えるとき、自然との関係も考える（２）
- 私は地球に所属することと同じくらい、地球も自分に所属していると感じる（７）
- 自分の人生を考えると、私はより大きい循環システムに所属していること想像する（５）

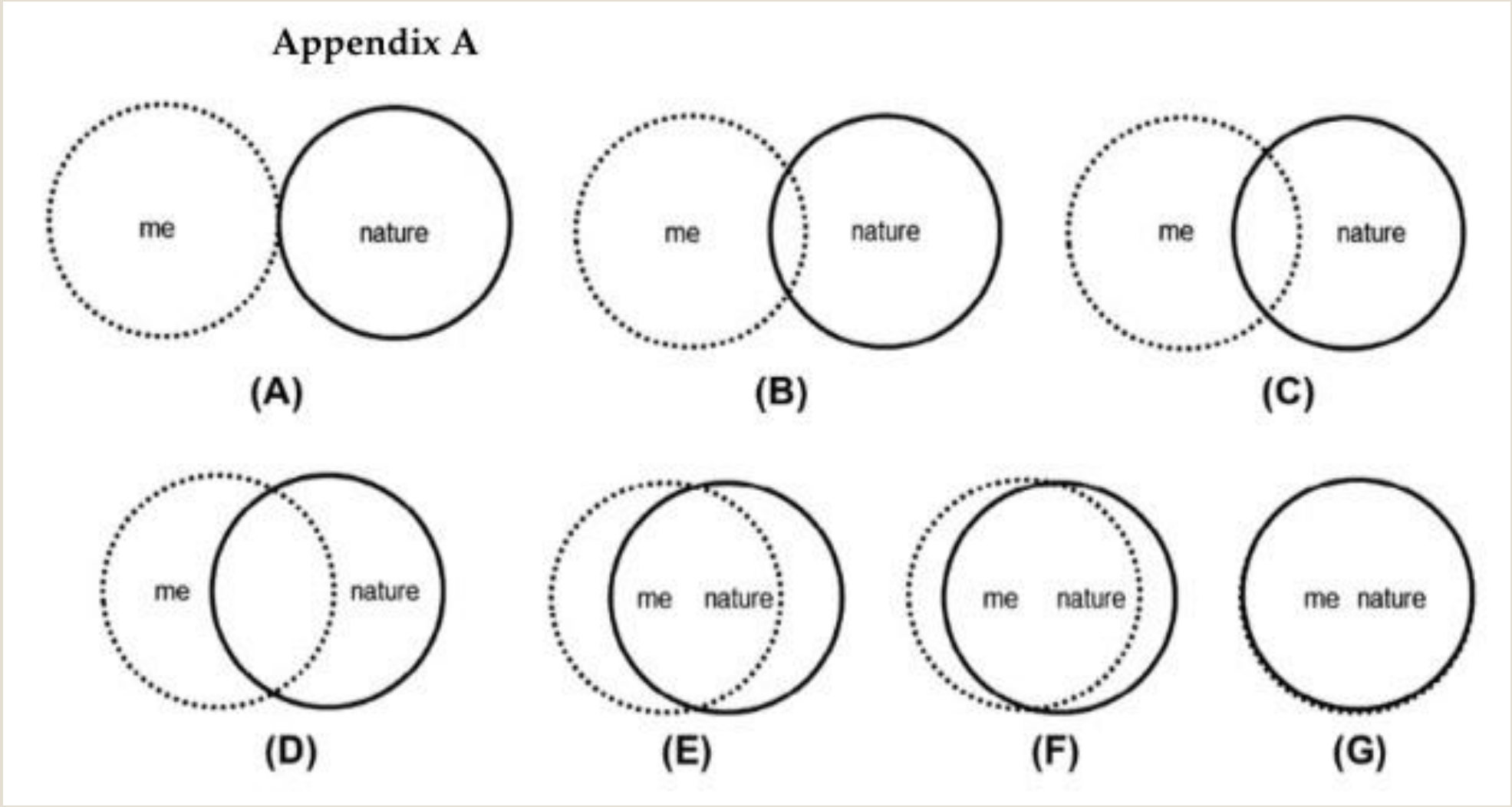
研究方法(INS)

- 定義：
- The Inclusion of Nature in Self Scale is a one-dimensional, graphical questioning tool by Schultz [12] following the example of the “Inclusion of Other in the Self Scale” by Aron et al. [52]. It was designed to measure the cognitive component of being connected to nature.
- Inclusion of Nature in Self Scale（INS）は、一次元のグラフィカルアンケートであり【12, 52】、自然とつながる認知的要素を測定するため、使用されている。

研究方法(INS)

- INS内容：
  - It consists of seven pairs of circles, which differ in the degree of overlap.
  - このツールは7対の円からなり、重なりの程度が異なる。
  - One circle is labeled with “me”, the other with “nature” (Appendix A).
  - 一方の円には「私」、もう一方の円には「自然」とラベルが付けられている（付録図A）。
  - The participants had to choose the pair of circles that best describes their relationship to nature. The scale ranges from two separate circles (separate from nature) to two completely overlapping circles (one with nature).
  - 参加者は、自然との関係を最も表すペアを選ぶ。量表は、2つの円の範囲が完全に分離している状態（自然と分離）から、2つの円が完全に重なっている状態（自然と一体）まで。

研究方法(INS)

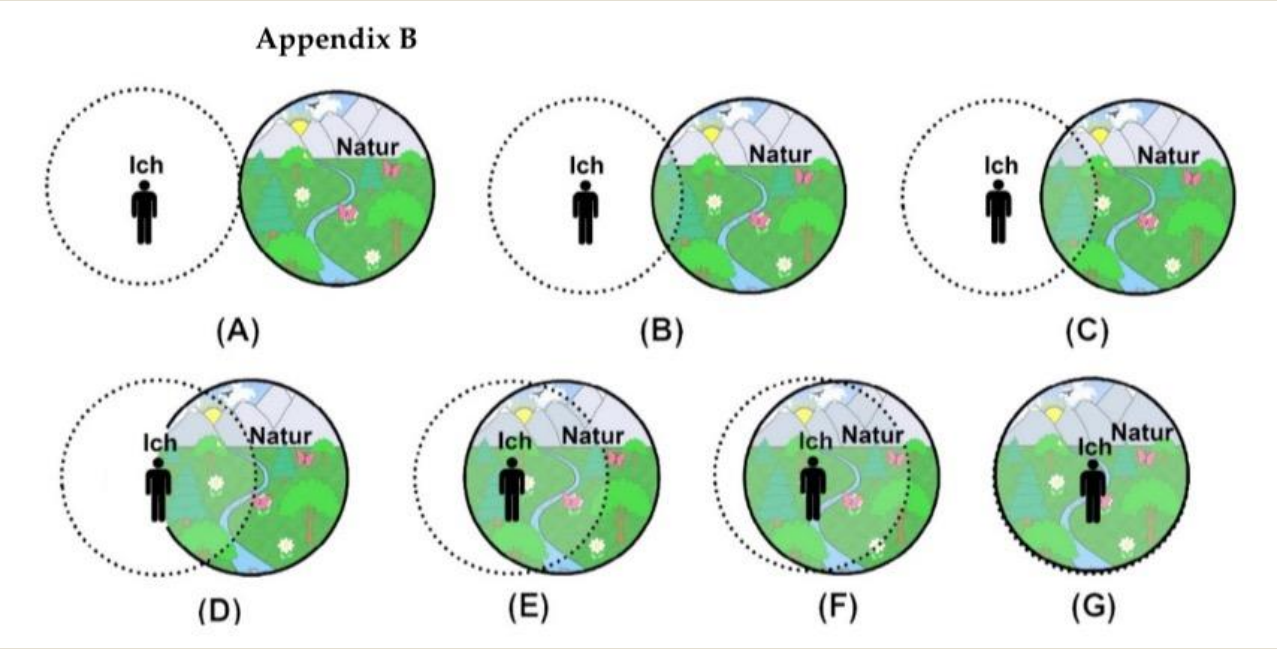

Appendix A
me
nature
(A)
me
nature
(B)
me
nature
(C)
me
nature
(D)
me
nature
(E)
me
nature
(F)
me
nature
(G)

研究方法(INS)

- 応用:
- Despite its simplicity, the instrument shows a strong positive correlation with other instruments for connecting with nature [44 , 48, 50] and was tested and applied in many studies [21–23,53,54].
- この量表は、そのシンプルさだけではなく、他の自然とのつながりを測定する量表と強い正の相関を示し【44, 48, 50】、多くの研究で適用されている【21-23, 53, 54】。

研究方法(IINS)

- The Illustrated Inclusion of Nature in Self Scale that was developed in study 1 (see Appendix B) was also applied
- 第1研究で開発されたIllustrated Inclusion of Nature in Self Scale（IINS）も適用された（付録図B参照）。



Study2（分析）

- IBM SPSS 27を採用した
- Step1:the five CNS items was conducted to verify the single factor structure of the instrument(to determine whether the five CNS items used were suitable for factor analysis)
  - CNSの五つ項目を分析し、そしてこの項目は研究に適当ではないか、判断する
- Step2:To check whether the age and gender distribution in the two test groups differed significantly
  - 二つの組での性別と年齢は差別が存在しているか、検証する
- Step3:to compare the INS and CNS values of the two test groups
  - 二つの組のINS,CNSのデータを比較する
- Step4:the Pearson correlation between CNS and INS was calculated for both groups
  - 二つの組のINS,CNSのPearson相関係数

Study2（分析結果）

- Step1:meeting the requirements for factor analysis
  - 因子要求に合う
- Step2:showed no significant difference
  - 明確的な意味はない
- Step3:showed no significant differences
  - 明確的な意味はない
- Step4:the first group (winter semester 2018/19) was $r = 0.595$ ($p < 0.001$), for the second group(winter semester 2019/20) $r = 0.618$ ($p < 0.001$)

Study2（結論）

- This confirms that the CNS items used reflect the one-dimensional construct well and that internal consistency is given. Therefore, it is suitable for further analysis.
  - 使用されたCNSは、単一次元の構造を反映し、良好な内部一貫性を示す。さらなる分析に適する。
- The comparison of the gender distribution between the two groups tested shows no significant difference. A different gender distribution between the groups of the study could have led to a distortion of the results. This can be excluded.
  - 研究における異なる性別分布は結果のゆがみをもたらす可能性がる、二つの組の間で性別分布が等しいため、この点は排除される。

Study2（結論）

- The age effect in terms of connection to nature is more explicit. Younger students have higher values of connection to nature than older ones.
  - 年齢が自然関係に与える影響はより明確で、年齢が小さい学生が年齢が大きい学生よりも高い自然関係を持っている
- The illustrated version of the INS quantifies the connection to nature like the original version of the INS.
  - 文献との比較から、新たな図的INS（IINS）が元INSと同様に自然との関連を定量化できる

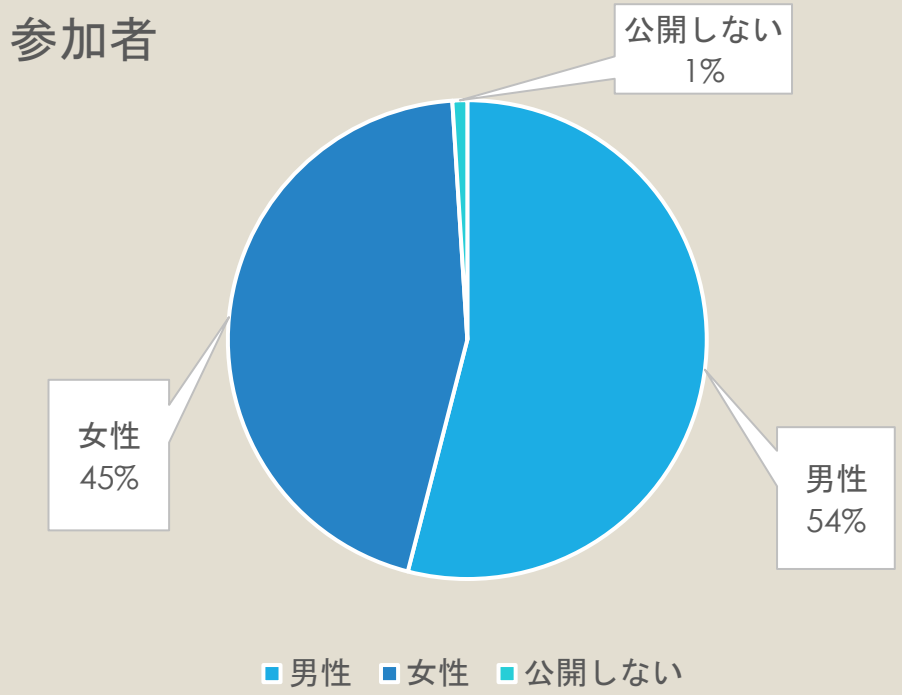
STUDY 3

目的

- the instrument was tested together with other established nature connection instruments on the actual target group, students with disabilities.
  - 他の既存の自然へのつながりの尺度とともに、実際の対象集団（認知障害がある学生）でテストする
- In addition, it was compared to established nature connection instruments (CNS and NR-6)
  - IINSは既存の自然とのつながりを測定する器具（CNSおよびNR-6）と比較される

研究方法

- A total of 106 participants were questioned for this sub-study.
- 参加者は総計106人
- 45% of the participants were female, 54% male and 1% did not want to give any information about their gender.
- 女性は45%を占め、男性は54%を占めている。また、１%の人は性別を公開していない。
- The age distribution ranged from 9 to 14 and all students were diagnosed with special educational needs in the area of learning.
- 参加者の年齢は9歳から14歳まで、すべての学生が特別な教育的ニーズを診断されていました



研究方法

- 使用された量表：IINS、省略版CNS、NR-6（自然関連性）
  - the IINS and the shortened version of the CNS were used for this study.
- NR-6とは？
- 自然とのつながりを測定するための尺度であり、個々の自然界との関係を記述するものです。この概念には、他の生物とのつながりの理解と評価が含まれます。
  - the nature relatedness scale (NR) of Nisbet et al. [6] was used to measure the connection to nature. This is a construct of nature connection, which describes the indi- vidual relationship to the natural world.

結果

- the illustrated version of the INS can be used as a useful alternative for measuring the connection to nature, especially for groups, as in our case, where other instruments are not suitable.
- INSの図示バージョンは、他の測定器具が適さないグループでの自然とのつながりを測定するための有用な代替手段として使用できることが示されています。

本研究の制限

- The developed illustrated scale reflects the idea of nature from a Western cultural area.
- 開発された図示尺度は、主に西洋文化圏の自然観を反映している。
- it has yet to be tested whether it provides precise results outside of the Western cultural area.
- 西洋文化圏以外でこの尺度が正確な結果を提供するかどうかは、まだ検証されていない。
- it is possible that information was lost and the result influenced by the use of reduced scales.
- その結果が省略版の使用により情報が失われ、影響を受ける可能性がある。

研究のまとめ

- 研究1の結果：
  - 子供たちが自然と考えるものや関連付けるものに関する重要な情報を提供。
  - 図示された測定道具が開発された。
- 研究2の結果：
  - 新しいIINSと元のINSの間に有意な差は見られず、両方が同じ自然とのつながりの構成概念を示唆する。
- 研究3の結果：
  - 実際の対象グループに対してIINSがテストされ、高い収束妥当性（convergent validity）を確認。
  - 幼い子供や精神的障害を持つ人は自然とのつながりを測定するため、適切な測定器具を提供できる。

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