

## High Risk Sexual Behaviour may be Identified by a Short Version of the Fisher Temperament Inventory

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Sexually transmitted infections (STIs) are increasing worldwide and are a common cause of suffering, morbidity and high costs (1). Implementation and services aimed at early diagnosis of STIs to ensure effective medical treatment and prevent further transmission is a priority in many countries. High numbers of sexual partners, abstaining from condom usage, and binge-drinking of alcohol are factors increasing the risk of acquiring STIs (2–4). Psychological characteristics are also important, as they further differentiate individuals in terms of STI risk. Studies regarding the association of personality traits and sexual behaviour are scarce and the findings are not always consistent. A holistic approach to identifying STI risk, by matching temperament traits with high-risk subgroups for acquiring STIs, could be an additional tool in controlling STI transmission. The Fisher Temperament Inventory (FTI) is a personality questionnaire, measuring 4 foundational patterns of thinking and behaving (5, 6). The FTI consists of a 56-item questionnaire, comprising 4 broad temperament dimensions (Curious/Energetic, Cautious/Social Norm Compliant, Analytical/Tough-Minded And Prosocial/Empathetic), with each temperament dimension measured with 14 statements. The FTI has been correlated with 2 functional magnetic resonance imaging (fMRI) studies (5) and has been positively correlated with the Five Factor Model, the most used conceptualization model for personality traits based on empirical evidence (6, 7). FTI can also be useful in understanding the role of basic human temperament in susceptibility to any disease and/or behavioural syndrome, as well as understanding the role of temperament in patterns of abnormality in educational, social and family issues. Thus, as there are no simple methods for clinicians to assess high-risk sexual behaviour, the aim of this study was to explore the usefulness of FTI regarding this matter.

### MATERIALS AND METHODS

Questionnaires (Appendix S1) were administered consecutively between August 2019 to May 2021, to individuals attending the self-booked STI clinic at the Department of Dermatology and Venereology, University Hospital, Umeå, Sweden. A nurse provided the questionnaire to all visiting patients and the time it took to complete the questionnaire was 5–10 min. The self-booked STI clinic is a limited section of the STI department, managed by physicians assisted by nurses. Participants attend due to symptoms of an STI, anxiety after unprotected sex, receiving a notification, or just for safety reasons.

### Statistical analysis

Descriptive statistics was used for reporting background characteristics. Participants were stratified into 4 groups according to their risk of acquiring an STI. Risk groups were defined as: (i) higher risk (HR),  $\geq 5$  sexual partners (8) within the last 12 months and never or sometimes using a condom; (ii) moderate high risk (MHR),  $\geq 5$  sexual partners within the last 12 months and often or always using a condom; (iii) moderate risk (MR), 1–4 sexual partners within the last 12 months and never or sometimes using a condom; and (iv) lower risk (LR), 1–4 sexual partners within the last 12 months and often or always using a condom. One-way analysis of variance (ANOVA) test was used to compare mean scores on all 4 FTI temperament dimensions in each risk group, and Tukey's test was used in a post-hoc analysis to differ significant means between the risk groups. Spearman's rank, point bi-serial and Pearson's correlations were used for correlation analyses. Student's *t*-test was used for comparing mean data for Curious and Cautious (C/C) temperament traits ratio, in the HR group with all other risk groups. The level of significance was set at  $p < 0.05$ .

### RESULTS

A total of 221/298 individuals (83 men, 136 women, and 2 of unspecified gender) with a median age of  $27.0 \pm 7.19$  years participated. Missing data in FTI consisted of 55/12376 items (0.004%). The only background characteristic that differed between sexes was that men more often reported having a sexual partner of the same sex ( $p < 0.001$ ). A medical history of 1 or several STIs was reported by 33.9% ( $n = 75$ ), with *Chlamydia trachomatis* described as the most common infection ( $n = 53$ , 70.1%). Binge drinking was associated with an increased number of sexual partners ( $r = 0.23$ ,  $p < 0.001$ ) but not with condom usage ( $r = 0.09$ ,  $p = 0.11$ ). Individuals with higher FTI Curious dimension mean scores were more frequent in groups with higher risk of acquiring STIs. Individuals with high risk were positively correlated with having a Curious trait ( $p < 0.05$ ,  $r = 0.14$ ) and negatively correlated with the Cautious trait ( $p < 0.05$ ,  $r = -0.21$ ). One-way analysis of variance for FTI mean scores and different risk groups showed a significant difference between Curious ( $F(3, 212) = 3.45$ ,  $p = 0.018$ ,  $\eta^2 = 0.05$ ) and Cautious ( $F(3, 201) = 4.19$ ,  $p = 0.007$ ,  $\eta^2 = 0.06$ ) traits. Post-hoc Tukey analysis showed a significant difference between FTI mean scores of HR and LR groups for Curious temperament FTI subtype ( $23.7 \pm 7.48$ , respectively,  $19.7 \pm 8.03$ ,  $p < 0.05$ ) and for Cautious FTI trait ( $21.9 \pm 7.00$ , respectively,  $26.5 \pm 6.66$ ,  $p < 0.05$ ) (Table SI). Comparing data from C/C ratios for

all individuals, resulted in a significant difference only for the HR group ( $n=48$ ,  $p=0.002$ ) but not in other risk groups; MHR ( $n=52$ ,  $p=0.7$ ), MR ( $n=65$ ,  $p=0.37$ ) and LR ( $n=53$ ,  $p=0.13$ ).

## DISCUSSION

This study indicates that temperament traits, associated primarily with the dopamine system in the brain, play a significant role in high-risk sexual behaviour. In addition, a significant difference was found in Curious/Cautious trait ratio ( $p=0.002$ ), in individuals with a high risk of acquiring an STI. The Curious/Cautious ratio in Fisher Temperament Inventory is obtained via the results of 28 out of the total 56 questions. We suggest that a minor version of FTI with Curious/Cautious ratio  $\geq 3$ , could be a simple method in clinical practice to identify persons with high risk of acquiring an STI.

These findings also confirm previous knowledge regarding the association of binge drinking and risky sexual behaviour (9). Although this study did not investigate the role of nicotine among our participants, a combination of both alcohol and nicotine affects the mesolimbic reward pathway and results in an additive dopamine release in the nucleus accumbens (10). Finally, brief behavioural counselling regarding STI risk reduction may be effective, especially among women and in the appropriate setting. As women are more worried about personal and social complications associated with acquiring an STI, they more often blame themselves for acquiring a sexual infection (11, 12). Thus, the FTI questionnaire could be a valuable complementary tool for addressing several clinical issues, such as enabling effective management of patients by focusing on those with the highest risk of acquiring and transmitting STIs, triaging individuals seeking care in primary healthcare units/youth clinics for high-risk behavioural intervention. However, the potential usefulness of FTI in STI risk-reduction has to be determined by future research.

A strength of this study was the access to relevant participants at an STI clinic, which is a central healthcare hub in northern Sweden. Selection bias could have been a limitation as this study was conducted during the SARS-CoV-2 (COVID-19) pandemic. However, as no restrictions regarding availability of care existed in Sweden, between 2019 and 2021, and as only a minority of participants (33.9%) reported having a previous STI, we assume that there was a diversity, in personality traits and risk behaviour among the participants. In conclusion,

the importance of these findings is that individuals categorized according to the FTI trait Curious, seem to be at highest risk for acquiring STIs. Thus, the FTI could be modified to fit into clinical practice intended to simplify identification of individuals with high-risk sexual behaviour and evaluate psychological interventions in STI risk reduction.

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